THE UNIVERSITY
OF ILLINOIS
LIBRARY
690.5
CB
v.43

[illegible]

The pages which are missing were removed because they were advertisements.

INDEX

BUILDING AGE

22430
200 221
#22758

VOL. XLIII.—1921

BUILDING AGE PUBLISHING CORPORATION
912-920 BROADWAY, NEW YORK

1921 INDEX—BUILDING AGE

Issue Page

A

America's Making ....Nov., 57
Amount of Cement for Mortar........June, 64
Amount Window Space Necessary...June, 64
Apartment Houses ....July, 57
Apartment House at Landsdowne, Pa. Jan., 45
Apartment House for Twelve Families, Dec., 34
Apartment Houses Prove Good Investment ....Jan., 36
Apartment House, Six-Family........Nov., 46
Apartment House That Brings Good Rental ....July, 54
Apartments Made More Efficient....Mch., 53
Architect's Right to Compensation..Nov., 42
Architect's Own Home...............Nov., 45
Architectural League of New York Holds Annual Exhibit ....May, 30
Arena, Boxing Club....................July, 62
Artistic Fountain Detail in Cast Stone, June, 24
Attractive Brick House...............Sept., 42
Attractive Fire Place Detail..........Aug., 34
Attractive Four-Family House.......May, 55
Attractive Garden Gates.............Dec., 52
Attractive Layout for Five-Room Bungalow ....Oct., 51
Attractive Sign Board.................Dec., 48
Attractive Stucco Bungalow..........July, 57

B

Bank, Beaver Valley State............Mch., 20
Bank Buildings of Dignified Aspect..July, 21
Bank, Modern Design..................Dec., 42
Barns, Dairy ....Feb., 34
Barn, Modern Dairy....................Dec., 47
Bay Window, Brick, How to Lay.....June, 30
Beating Building Costs in Birmingham ....Sept., 33
Beaver Valley State Bank, Parkersburg, Ia. ....Mch., 20
"Before" and "After"....................Dec., 54
Better Building Methods..............Mch., 24
Better Building Methods..............May, 37
Birdsall House at Wenonah, N. J....Mch., 40
Blocks in Masonry, Securing........Nov., 39
Board-Feet in Logs....................Aug., 57
Breaking Concrete with Dynamite....Dec., 49
Brick Bay Window, How to Lay.....June, 30
Brick Cottage at Elmhurst, Ill........May, 52
Brick for the Home Builder..........April, 49
Brick House Designed for Building Age ....Nov., 30
Brick House Study....................Oct., 37
Brick Job, How to Do an Economical.July, 28
Brick, How to Clean....................Aug., 33
Brickwork, Painting ....June, 64
Brick Substituted Properly for Stone? June, 61
Bricks Vary in Quality, Shape and Size ....Sept., 28
Brick Veneer, How to..................June, 43
Bridging Cross, How to Use..........Sept., 25
Bridging, Easy Method of Marking...Nov., 38
Bungalow, Attractive Five-Room.....Oct., 51
Bungalow, Attractive Stucco.........July, 57
Bungalow, Economically Planned.....May, 25
Bungalows for $5,000 Popular with Home Builders ....Sept., 19
Bungalow, Four-Room, with Convenience of Six ....Oct., 21
Bungalow in California, A Colonial....Jan., 25
Bungalow, Modest ....May, 51
Bungalow, Thatched Roof.............Jan., 58
Bungalow, Unusual Colonial Design..Nov., 19
Bungalow with Four Front Doors...Feb., 55
Buffet and Bed..........................June, 28
Builder and Contractor Advertising Pays, July, 50
Builder as a Manufacturer...........July, 39
Builders' News ....Feb., 58
Building Age Questionnaire Indicates Small Towns Require 60% of Houses Needed in United States............Sept., 58
Building and Selling Homes on Co-Operative Plan ....April, 29
Building Ball, Start It Rolling........Mch., 30
Building Better Houses at Garden City ....Jan., 21
Building Code, National...............Aug., 29
Building Frame Houses...............April, 44
Building, Future of....................Aug., 58
Building Houses with Discarded Munition Boxes ....Sept., 54

Issue Page

Building Industry, What Is Situation in ....Mch., 32
Building Loan System Developed by the Metropolitan Life Insurance Company ....April, 26
Building Market Review...............May, 59
Building Material Market Review....April, 70
Building Methods, Better............Mch., 24
Building Methods, Better............May, 37
Building of the Budal Realty Co., Maplewood, N. J....................Mch., 44
Building Operations ....June, 51
Building Operations for January, 1921.Mch., 60
Building Operations in 1920...........Feb., 60
Building Operations in November....Jan., 35
Building Program, Planning Your.....Jan., 50
Building Publicity ....Nov., 57
Building Situation as It Exists Today, Sept., 58
Building Situation—See Review of Building Situation.
Building Up the Farms..............June, 50
Building with Concrete Blocks........Jan., 30
Built-in Features for Modern Homes.Dec., 36
Built-in Furniture ....May, 33

C

Can Architect Recover for Unauthorized Use of Plans?....................Aug., 45
Catalogs—See New Catalogs and Publications.
Cellar, Draining ....Oct., 58
Cellar, Securing a Dry..............Jan., 55
Cellar, Securing a Dry..............Feb., 50
Chapel, A Country....................June, 46
Charts, Progress, Reduce Costs.......Oct., 23
Chimneys, Attractive ....Nov., 56
Chimney Flues, Separate............June, 63
Church Architecture, For Better Small, Dec., 51
Church at Newton Center, Mass......May, 39
Church, Concrete ....Nov., 29
City Library at Indian Orchard, Mass., May, 42
Cleaning Down Stone Buildings......Aug., 42
Cleaning Painted Surfaces............July, 45
Closets Make Houses Livable........Aug., 38
Code, Necessity for a National Building, Aug., 29
Colonial Bungalow in California....Jan., 26
Colonial Home, Well Planned........Dec., 28
Combined Bank and Market Building, May, 26
Combined Buffet and Bed............June, 28
Comfortable Little Homes Built for Less Than $10,000....................Aug., 19
Common Sense in Plumbing..........April, 63
Community Action to Produce More Houses ....Nov., 33
Community Garages ....Dec., 50
Competition for Plan and Equipment of a Model Kitchen....................Jan., 50
Concrete Barn and Silo for the Up-to-Date Farmer ....July, 53
Concrete Beams, Design of............Nov., 47
Concrete Blocks, Building With....Jan., 30
Concrete Church ....Nov., 29
Concrete Foundations for Small Houses, July, 24
Concrete Houses—Cutting Costs on Double Wall ....Sept., 21
Concrete Houses, Small...............Aug., 24
Concrete Mixing....................Mch., 35
Concrete, Porous for Stucco Base....July, 43
Concrete, Proportioning...............June, 64
Concrete Steps Easy to Build......April, 62
Construction of Arena Where Dempsey-Carpentier Fight Took Place........July, 62
Constructing Queen Post Truss......Oct., 59
Correspondence Department...........Jan., 68
Correspondence Department..........Feb., 68
Correspondence Department......Mch., 58, 63
Correspondence Department..........June, 63
Correspondence Department............July, 44
Correspondence Department..........Aug., 56
Correspondence Department..........Sept., 54
Correspondence Department...........Oct., 58
Correspondence Department...........Nov., 38
Correspondence Department...........Dec., 48
Contractors' Extra Compensation....July, 39
Contracts Invalid for Fostering Monopoly of Labor ....Aug., 44
Corrugated Wire Glass Roofs........Aug., 61
Costs, Progress Charts Reduce.......Oct., 23
Country Chapel ....June, 46
Covering Steam Pipes..................Dec., 48

Issue Page

Cozy Stucco Home......................Oct., 63
Cracks in Cement Sidewalks..........July, 45
Creosoted Wood Silos.................Sept., 27
Cross Bridging, How to Use..........Sept., 25
Culvert, No-Form......................Sept., 54
Cutting Labor Costs on Double-Wall Concrete Houses........................Sept., 21

D

Daily Time Sheet Form................June, 49
Decay of Porch Posts..................June, 64
Departures from Building Contract Hold Back Payments ....Dec., 62
Design of Reinforced Concrete Beams. Nov., 47
Devices of Interest to Builders......May, 60
Dimensions of Flagpole...............June, 64
Doorway, Marblehead Neck, Mass....Jan., 49
Draining the Cellar....................Oct., 58
Dressing Table..........................Dec., 48
Driveway, Estimating.................Sept., 34
Dumbwaiters, How Installed..........July, 34
Dust Box Under Floor.................Aug., 57
Dutch Colonial House..................Aug., 49
Dynamite for Breaking Up Concrete, Dec., 49

E

Each Stove Should Have Separate Chimney ....Sept., 55
Easy Method of Marking Bridging...Nov., 38
Easy Surveying for the Builder......July, 29
Economy and Advantages of Group Development ....Dec., 24
Economy Applied to Dairy Barns....Feb., 34
Economical Heating Plant for Small House ....Oct., 60
Economically Planned Bungalow......May, 25
Editorial—See What the Editor Thinks,
Eight Small Cottages in Group......Nov., 39
Electric Home, Wiring of............June, 33
Electrical Homes at Los Angeles and Oakland, Cal....................May, 20
Electrical Homes, Modern.............May, 19
Electricity for Buildings..............Sept., 43
Ellipse, Novel Way to Draw an......Sept., 29
Enclosing the Rear Porch.............Nov., 34
English Design Hollow Tile House..Dec., 40
Entrance: House at Wingdale, N. Y., Mch., Cover
Estimating Costs, Practical Short Methods of ....Nov., 55
Estimating Driveways, Terraces, and Seeding ....Sept., 34
Estimates, How to Save Time in Preparing, Dec., 55
Extension Hangers for Shallow Closets, Aug., 55

F

Facts About Windows.................July, 58
Farm Buildings, Lighting by Electricity, Sept., 43
Farm Buildings, Making Attractive..Nov., 22
Farm Buildings, Ventilation of......Mch., 59
Farmer House Wanted................Sept., 26
Fences, Worm ....Dec., 48
Fern Box Made of Standard Molding, Aug., 55
Financing Homes, Suggestions for..June, 56
Financing the Small Building........Dec., 43
Finding Cost of Concrete Work......Aug., 32
Finish and Care of Hardwood Floors.Sept., 52
Fireplace Construction.................June, 40
Fireplace Construction.................July, 63
Fireplace, Correct Designing of.......Jan., 59
Fireplace Detail ....Aug., 34
Fire House, Small.......................July, 40
Fire House and Town Hall..........Dec., 44
Flagpole, Dimensions of..............June, 64
Flat Building Suitable for Narrow Lot, Oct., 46
Floors and Walls of Public Comfort Stations ....Oct., 58
Floor Scraping Kink....................Dec., 49
For Better Small Church Architecture, Dec., 51
Foreword—Landing the Job..........Mch., 19
Foreword—Modern Electrical Homes, May, 19
Foundations, Concrete, for Small Houses, July, 21
Fountain in Cast Stone...............June, 24
Four-Family House ....May, 55
Four-Room Bungalows with the Convenience of Six Rooms....................Oct., 21

CB
v.43

Issue Page
Frame Roof, How to Lay Out......May, 43
From Cabinet Maker to Million-Dollar Contractor ....July, 25
From Carpenter to School Builder...Dec., 31
Future of Building..................Aug., 58

G

Gambrel Roof, How to Frame........Oct., 33
Garages, A Page of..................Nov., 44
Garages, Community ....Dec., 50
Garages for the Small Home........July, 41
Garage from Old Barn...............June, 58
Garden Gates, Attractive...........Dec., 52
Garden Wood Work That Adds Beauty to the Grounds ....July, 31
Gates, Garden ....Dec., 52
General Business Outlook Healthier..Oct., 48
Getting Business Funds from Savings and Loan Associations ....July, 47
Giving a Frame Roof a Thatched Appearance ....Mch., 38
Good Closets Make Small Houses More Livable ....Aug., 38
Good Hardware Makes a House Run Smoothly ....Aug., 27
Grand Stand ....July, 62
Grounds About the House............June, 23
Group Development...................Dec., 24
Grouping Houses to Get Ideal Homes, Aug., 58

H

Halifax, Rebuilding of................Feb., 21
Hardware, Good, Makes a House Run Smoothly ....Aug., 27
Heating Plant for Small House......Oct., 60
Heating Systems Analyzed...........May, 46
Heating the Small House............April, 55
Helping Workmen to Own Homes..Nov., 57
Here's a Builder Who Gets Big Jobs—And Tells How He Does It........Aug., 22
Hollow Tile House of Dignified Design, Nov., 50
Hollow Tile House of English Design, Dec., 40
Hollow Tile School...................Dec., 30
Home-Made Screener Saves Time....Nov., 38
Homes of Our Movie Stars...........Oct., 42
Home, Six-Room for Corner Lot......Oct., 19
House at Cincinnati, Ohio...........May, 56
House at Cleveland Heights, Ohio....May, 54
House at Keene, N. H................May, 58
House at Merion, Pa.................Mch., 47
House at Milwaukee, Wis............Mch., 45
House at Narbrook, Pa..............Mch., 43
House at Paterson, N. J............Mch., 41
House at Seattle, Washington........April, 35
House at Stockton, California........April, 38
House at Summit, N. J...............Jan., 41
House at Tenafly, N. J..............Mch., 46
House Competition, National Small House, April, 20
House Designs, Two Small Popular..Nov., 23
House Developments, Small..........June, 26
House, Hollow Tile...................Nov., 50
House at Carney Chess, Terra Haute, Ind., April, 41
House of D. W. Nye, Kew Gardens, L. I., N. Y. ....Feb., 39
House of E. J. Eckenrode, Maumee, Ohio, Jan., 48
House of Fred J. Carver, Seattle, Wash., Feb., 44
House of Fred Schofield, Paterson, N. J., April, 36
House of James Warburton, Jr., Paterson, N. J. ....May, 57
House of B. H. Davis, Pelhamwood, N. Y., Feb., 41
House of Wilmer A. Cadmus, Paterson, N. J. ....April, 37
House on College Ave., Indianapolis, Ind., Jan., 46
House at Garden City.................Jan., 42
Houses, Community Action to Produce More ....Nov., 33
Houses Designed for Building Age Readers, Oct., 24
Houses Designed for Building Age Readers, Oct., 25
Houses Designed for Building Age Readers, Nov., 30
Houses Designed for Building Age Readers Dec., 40
Houses of Guy C. Foster, Tenafly, N. J., April, 42
Houses, Quantity Production of......Sept., 48
Houses, Prizes Awarded for Best Designed, Mch., 52
How and When to Use Stone for Foundation Work ....Aug., 43
How Can Repair and Tax Bill Be Collected? ....Sept., 40
How Dumbwaiters Are Installed......July, 34
How France Is Building New and Better Low-Cost ....Sept., 36

Issue Page
How Progress Charts Reduce Building Costs. By Noble Foster Hoggson..Oct., 23
How Shingle Staining Gives Individuality, June, 22
How Small Builders Can Use Motor Trucks and Save Money.....................Aug., 46
How Tax Exemption Helps Home Builders in New York.........................April, 25
How to Build Stucco Houses........June, 37
How to Clean Brick..................Aug., 33
How to Construct a Store Front......June, 29
How to Do an Economical Brick Job..July, 28
How to Estimate Driveways, Terraces and Seeding ....Sept., 34
How to Find the Strength of Ropes..Dec., 49
How to Frame a Curved Rafter Roof, Dec., 38
How to Frame a Gambrel Roof......Oct., 33
How to Get Best Results in Laying Floor and Other Tile........................July, 33
How to Lay a Brick Bay Window....June, 30
How to Lay Out a Frame Roof....Feb., 24
How to Lay Out a Frame Roof......Mch., 49
How to Lay Out a Frame Roof......May, 43
How to Make a Card Catalog Case....Feb., 54
How to Make a Dressing Table......Dec., 48
How to Make Stairs That Will Be Comfortable ....July, 55
How to Prepare Ads That Build Business. ....July, 48
How to Save Time in Preparing Estimates. ....Dec., 55
How Untermyer Would Prevent Criminal Control of Building Prices....Sept., 39
How to Use Photographs in Advertising, Sept., 56
How to Veneer Frame Buildings With Face Brick............................June, 43

I

Illinois Statutes Affecting Contractors and Material Men....................Oct., 44
Improved Equipment for Builders and Contractors. ....Oct., 47

J

Joining New Concrete to Old..........July, 44
Judge Landis Gives Chicago Building Trades 12½% Cut....................Oct., 52

K

Keeping Building Costs...............Feb., 28
Kind of House Mrs. Farmer Wants..Sept., 26
Kitchen, Competition for Model......Jan., 50

L

Laying Tile Floors....................Oct., 58
Legal Department.......................Feb., 61
Legal Department.....................Mch., 70
Legal Department......................May, 61
Legal Department......................June, 61
Legal Department......................July, 38
Legal Department......................Aug., 44
Legal Department.....................Sept., 40
Legal Department......................Oct., 44
Legal Department......................Nov., 42
Legal Department......................Dec., 60
Letters From Readers—See Correspondence.
Liability of Land for Improvements Not Contracted for.........................Aug., 45
Library at Indian Orchard, Mass......May, 42
Lighting Farm Buildings by Electricity, Sept., 43
Lighting Fixtures, A New Idea in....Feb., 33
Lighting the Home....................April, 59
Linoleum Floor Coverings............June, 47
Loaning Money on Long Term Lease, Sept., 32
Lumber Costs Reduced, Effect of...June, 32
Lumber Market Review................Jan., 39
Lumber Market Review................Feb., 59
Lumber Market Review................Mch., 61

M

Magnesite Stucco......................Nov., 52
Making Farm Buildings Attractive..Nov., 22
Making It Safe to Build.............Nov., 49
Making Sound-Proof Partitions.......Nov., 39
Masonry, Securing Blocks in........Nov., 39
Masonry, Wrecking...................June, 24
Materials Placing on the Job......Sept., 24
Material Prices........................June, 52
Metal Lumber in Small Houses....Sept., 39
Method of Estimating Excavation and Finished Grading.....................June, 54
Method of Taking Off Quantities....Sept., 54
Minnesota's New Registration Law..July, 38
Mitering Rake and Level Mouldings..Nov., 32
Mixing Concrete Thoroughly, Quickly and Correctly. ....Mch., 35
Models to Secure Business...........Nov., 54
Moderate Price House of Tile and Stucco, Jan., 39
Moderate Size Apartment Houses Prove Good Investment......................Jan., 36

Issue Page
Modern Apartment House That Brings Good Rentals.........................July, 54
Modern Bank Design..................Dec., 42
Modern Dairy Barn....................Dec., 47
Modern Plumbing Fixtures...........June, 45
Modern Six-Family Apartment House, Nov., 46
Modest Bungalow.......................May, 51
Money, Loaning on Long Term Lease, Sept., 32
Motion Picture Theatre That Seats 1,500 People. ....Oct., 31
Motor Truck, Efficiency of...........Feb., 46
Mouldings, Mitering Rake and Level, Nov., 32

N

National Small House Competition Awards, Prizes. ....April, 20
Necessity for National Building Code, Aug., 29
New Apartment with Electric Stoves, July, 57
New Catalogs and Publications........Jan., 64
New Catalogs and Publications......Feb., 64
New Catalogs and Publications......Mch., 66
New Catalogs and Publications......April, 66
New Catalogs and Publications......May, 64
New Catalogs and Publications......June, 66
New Catalogs and Publications.......July, 66
New Catalogs and Publications......Aug., 66
New Catalogs and Publications......Sept., 64
New Catalogs and Publications.......Oct., 65
New Catalogs and Publications......Nov., 62
New Catalogs and Publications.......Dec., 64
New Devices of Interest to Builders, Feb., 72
New Devices of Interest to Builders, Mch., 62
New Devices of Interest to Builders, May, 60
New Idea in Lighting Fixtures......Feb., 33
New Jersey Architect's License......Nov., 39
New Wire Scratch Brush..............June, 70
No-Form Culvert.......................Sept., 54
Not Mere Tenements—But Homes...Oct., 64
Novel Heating and Ventilating Equipment, June, 70
Novel Method of Wrecking Masonry, June, 24
Novel Way to Draw an Ellipse......Sept., 29
Now Is a Good Time to Fix Up the Old Roof. ....Sept., 31

O

Old Barn Made Into Eleven-Stall Garage, June, 58
Old Buildings, Tearing Down........Sept., 45
One Effect of Reduced Lumber Costs, June, 32
One Room Equals Four................Aug., 55
Outdoor Painting.......................July, 64
Own Your Home.......................April, 21
Own Your Home Exposition..........May, 29
Owner Replaces Defective Work......July, 38
Owner's Duty to Express Dissatisfaction in Progress of Work................Oct., 45
Overhead Kitchen Clothes Drier......Aug., 55

P

Page of Garages.......................Nov., 44
Painting Brickwork...................June, 64
Painting, Outdoor......................July, 64
Picturesque Residence in Galva, Ill...Feb., 20
Pine Knots, Treatment of............Dec., 46
Photographs in Advertising..........Sept., 56
Photographs to Secure Jobs..........Nov., 40
Placing Building Materials on the Job, Sept., 24
Placing Grounds for Plastering......Dec., 49
Plan a House, What to Think About, June, 19
Planning Your Building Program....Jan., 50
Plastering Concrete Walls............July, 45
Plastering, Guards for................Dec., 49
Plaster Wall Cracks...................July, 45
Plumbing Fixtures, Modern...........June, 45
Pointing Masonry Joints..............July, 45
Pomander Walk........................Dec., 19
Porch Columns, Preventing Decay of, Sept., 55
Porch, Enclosing......................Nov., 34
Porch Post Decay, Prevention of.....June, 64
Porches, Day and Night...............June, 31
Porch Floors, Renovating............Sept., 54
Porous Concrete as a Stucco Base....July, 43
Practical Short Method of Estimating Costs. ....Nov., 55
Preventing Decay of Porch Columns.Sept., 55
Preventing Decay of Porch Posts....June, 64
Prizes Awarded for Best Designed Houses, Mch., 52
Proportioning Concrete................June, 64
Proportions for Schoolrooms..........June, 63
Proportions, Treads and Risers........July, 44
Public Works and Utilities............Oct., 48
Publications—See New Catalogs and Publications.
Putty, Replacing Old..................Nov., 38

511373

Issue Page

Q

Quantities, Taking Off..........Sept., 54
Quantity Production of Houses......Sept., 48
Questionnaire, on Building Situation..Sept., 58

R

Rake and Level Mouldings..........Nov., 32
Real Building in Reel Building......Nov., 41
Rear Porch, Enclosing..........Nov., 34
Rebuilding Pueblo, Colo..........July, 50
Rebuilding the City of Halifax.......Feb., 21
Recovery for Defectively Performed But Accepted Work..........Oct., 45
Reeves Mitre Clamp..........June, 70
Remodeling Makes Old Buildings Pay Dividends..........Aug., 63
Remodeling Old Houses a Good Source of Business..........July, 35
Remodeling With Wallboard..........May, 48
Renovating Porch Floors..........Sept., 54
Replacing Old Putty..........Nov., 38
Residence at Merion, Pa..........Mch., 42
Review of Building Market..........May, 59
Review of the Building Situation......June, 51
Review of Building Situation..........July, 51
Review of Building Situation..........Aug., 59
Review of Building Situation..........Sept., 49
Review of Building Situation..........Oct., 49
Review of Building Situation..........Nov., 59
Review of Building Situation..........Dec., 56
Right of Builder to Abandon Work Because of Delayed Installments......Dec., 62
Right to Follow Another's Building Model, Sept., 40
Right Way to Use Cross Bridging, Sept., 25
Rights Pertaining to Extension Party Walls..........Aug., 44
Roof, Curved Rafter, How to Frame..Dec., 38
Roof, Fixing Up the Old..........Sept., 37
Roof, Hint Lay Out a Frame........Mch., 49
Roof, How to Frame a Gambrel......Oct., 33
Roof, How to Lay Out a Frame......Feb., 24
Roof, Thatched..........Mch., 38
Roomy High School of Artistic Design, Oct., 41
Ropes, Strength of..........Dec., 49

S

Safe Sewage Disposal for Country Dwellings..........Oct., 29
Safe to Build, Making It..........Nov., 49
School Builder, Successful..........Dec., 31
School, High, Artistic Design..........Oct., 41
School, Hollow Tile..........Dec., 30
School, Small..........June, 25
Schoolrooms, Proportions for..........June, 63
Securing a Dry Cellar..........Jan., 55
Securing a Dry Cellar..........Feb., 50
Securing Blocks in Masonry Wall....Nov., 39
Seeding, Estimating..........Sept., 34
Selected Bits from a Builder's Diary..Oct., 56
Selling New Houses..........Aug., 50
Separate Chimney Flues..........June, 63
Sewage Disposal for Country Dwellings, Oct., 29
Shingle Staining Gives Individuality.June, 22
Short Cuts in Estimating Costs—By I. P. Hicks..........Aug., 48
Side Hill Residence..........Nov., 37
Sign Board, Attractive..........Dec., 48
Silos..........Sept., 26
Simple Dignified Hollow Tile House..Nov., 50
Six-Room House for Small Corner Lot.Oct., 19
Six-Room House That Can Be Built on Small Lot..........Aug., 35
Small Apartments Made More Efficient, Mch., 53
Small Capital Required to Build Moderate-Cost Homes..........Oct., 38
Small Concrete Houses..........Aug., 24
Small Fire House..........July, 40
Small House Built with Standardized Metal Lumber..........Sept., 39
Small House Developments..........June, 26
Small Houses at Moderate Cost.....April, 23
Small School Building..........June, 25
Small Studio Cottage..........May, 23
Small Theatre Well Handled..........June, 36
Some California Bungalow Courts...Dec., 22
Something Unusual in Equipment....Aug., 55
Sound-Proof Partitions..........Nov., 39
Sound-Proof Wood Floors..........July, 45
Source of Information Worth Cultivating..........Aug., 58
Stairs, How to Make Comfortable....July, 55
Start the Building Ball Rolling.......Mch., 30
Steam Pipe Covering..........Dec., 48
Steps, Concrete, Easy to Build......April, 62
Stone, Cleaning..........Aug., 42
Stone for Foundations, How and When to Use..........Aug., 43
Store Front, How to Construct.......June, 29
Stucco House, A Cozy..........Oct., 63
Stucco House, How to Build..........June, 37
Stucco, Magnesite..........Nov., 52
Stucco on Hollow Tile Houses........April, 51
Studio Cottage..........May, 23
Studios in the City and in the Country, July, 60
Study in Brick..........Oct., 37
Subdividing Large Rooms for Small Meetings..........Aug., 52
Substantial Performance of Indefinite Contracts..........Oct., 45
Successful Woodworking Business...Nov., 24
Suggestion for Concealing Pump.....Aug., 56
Suggestions for Correct Designing of Open Fireplaces..........Jan., 59
Suggestions for Financing Homes....June, 56
Suggestions for Wall Treatment.....June, 59
Summer Cottages..........Aug., 28
Surveying for the Builder..........July, 29
Supervising Architects as Owner's Agent, Aug., 45

T

"Take a Chance," Says Senator Calder, Oct., 48
Talk Building to Them Early........Oct., 61
Tax Exemption Helps Home Builders, April, 15
Tearing Down Old Business Buildings..........Sept., 45
Tenements No Longer Sound Investments..........Sept., 49
Terraces, Estimating..........Sept., 34
Test of Plumbing System..........July, 45
Thatched Appearance to Roof........Mch., 38
Thatched Roof Bungalow..........Jan., 58
The Architect or Builder as an Expert Witness..........Dec., 60
The Efficiency of the Motor Truck..Feb., 48
The Outlook for Building in 1921......Jan., 19
The Time to Build Is Now..........April, 19
Theatre, Motion Picture..........Oct., 31
Theatre, Small, Well Handled..........June, 36
Thickness of Walls..........June, 63
Tile Floors, Laying..........Oct., 58
Tile Laying, How to Get Best Results.July, 33
Time for Filing Lien..........July, 39
Tiny Summer Cottages for Seashore and Mountain Resorts..........Aug., 28
Title Guarantee and Trust Company Aids Housing in New York..........Sept., 38
Tomorrow's Landlord..........June, 44
Town Hall, Weston, Mass..........May, 40
Town Hall and Fire House..........Dec., 44
Treatment of Pine Knots and Sappy Parts..........Dec., 46
Trend of Building Material Market..July, 52
Trend of Material Prices..........Aug., 60
Trend of Material Prices..........Sept., 50
Trend of Material Prices..........Oct., 50
Trend of Material Prices..........Nov., 60
Trend of Material Prices..........Dec., 58
Trinity Church, Newton Center, Mass., May, 39
Trouble in Raising Old Roof..........July, 44
Truss, Queen Post, Constructing......Oct., 59
Twelve-Family Dwelling with Unusual Exterior..........Dec., 34
Two Bungalows of Different Exteriors, But Planned Almost Alike..........Sept., 51
Two Homes That Reflect the Spirit of Country Life..........July, 19
Two-Family House, Paterson, N. J...May, 53
Two-Family Houses Are Popular....June, 41
Two-Family Houses That Are Different, July, 46
Two Popular Small House Designs...Nov., 23
Two Well-Planned Moderate-Cost Houses Designed for Building Age Readers, Oct., 24, 25

U

Unemployment Costs Building Trades Half Billion Annually..........Aug., 41
Unique Offices That Help Advertise Your Business..........Aug., 31
Unusual Bungalow of Colonial Design, Nov., 19
Unusual Side Hill Residence..........Nov., 37
Use of Models to Secure Business...Nov., 54
Use of Photographs to Secure Jobs..Nov., 40

V

Ventilation, Farm Building..........Mch., 59

W

Wage Scales in the Building Trades.Nov., 58
Waiving Right to a Lien..........July, 39
Wall Board Ceiling Design..........Nov., 38
Wall Treatment Suggestion..........June, 59
Watch the Wrapper..........Nov., 57
Well Planned Brick House Designed for Building Age Readers..........Nov., 30
Well Planned Colonial Home..........Dec., 28
What Are Builders Thinking About Today?..........Feb., 19
What Is Good and Workmanlike Manner?..........Nov., 43
What Is the Situation in the Building Industry?..........Mch., 32
What the Editor Thinks..........June, 50
What the Editor Thinks..........July, 50
What the Editor Thinks..........Aug., 58
What the Editor Thinks..........Sept., 48
What the Editor Thinks..........Oct., 48
What the Editor Thinks..........Nov., 57
What the Editor Thinks..........Dec., 53
What the Housewife Likes in Her Home..........Oct., 62
What to Think About When You Plan a House..........June, 19
When Fences Mark Property Boundary Lines..........Oct., 44
When Written Contracts May Be Contracted..........Nov., 43
Who Is Responsible for High Costs...July, 50
Why Bricks Vary in Quality, Shape and Size..........Sept., 28
Why Build Houses to Be Burned Up? Mch., 21
Why Is a Freight Rate?..........Aug., 59
Why Some Houses Do Not Sell.......June, 50
Wilbur Theatre, Boston, Mass.......May, 41
Windows, Facts About..........July, 58
Window Seats..........June, 57
Winter Unemployment in the Building Industry..........June, 51
Wiring of the Home Electric..........June, 33
Withdrawing Proposal Before Acceptance, July, 39
Woodworker's Chisel from Old File.July, 44
Woodworking Business Successful...Nov., 24
Work Done to Owner's "Satisfaction".June, 61
Work, Save and Prosper..........Sept., 48
Worm Fences..........Dec., 48
Wrecking Masonry..........June, 24

Y

Your New Houses—How to Sell Them.Aug., 50

BUILDING AGE

New York, January, 1921

The Outlook for Building in 1921

A Carefully Conducted Investigation into All Phases of the Building Industry Indicates a Return to Stable Conditions and a Very Active Year

THERE are still with us in this enlightened age those who hie their way to clairvoyants having a reputation for ability to foretell the future —(for an inducement)—and on the strength of information thus received, invest their all—and lose. We feel slight sympathy for such, and yet investigation will reveal many business men acting as foolishly on market tips just as unreliable as a gypsy's tale. In the financial district of every large city there exists a class who ever possesses a thirst for sure tips from authoritative sources so-called. Action based on heresay information from doubtful sources, cannot too strongly be condemned, and those so eager to advise loosely should stop their mouths. Information based on the most reliable data available, while not so freely passed around, is, however, of much more value.

The Present Trend Indicates

Easier money market, and consequently less difficulty in financing building construction.

Improved transportation service, resulting in more prompt movement of materials.

Increased labor efficiency, making possible a decrease in the cost of building.

More stable and somewhat lower average price conditions in building products than during preceding year.

With a desire, not to prophesy, but accurately to present to our readers the most careful information on conditions, Building Age has conducted a very thorough investigation of the various phases of the building industry. Out of the mass of information thus received, an endeavor will be made to give data of real value to our readers.

It is necessary to keep in mind that there are controlling factors which always affect labor and material prices, and therefore, building construction. During recent months declines in the prices of various commodities have occurred, widely announced in the daily press. The general public, therefore, concludes that we are headed for pre-war prices in every available commodity. This is not so.

An investigation of the causes which lead to a sharp drop in prices in several instances will be sufficient to show that the conditions in such lines have no parallel in the building industry. In many of these lines there was an actual overproduction, and a high price level artificially maintained despite this fact. This acted as a dam to obstruct the distribution of the product to the ultimate consumer. The surplus material thus accumulated exerted so great a pressure on the high price dam as to cause a break.

In the building industry there is no over supply of the finished product. In housing accommodations alone it is now estimated that considerably over a million homes could be absorbed before pre-war conditions were reached. The need is there. The builders must supply it. There is practically no surplus of building materials. The low stocks on hand will disappear as snow under a mid-summer sun as soon as a real building program commences, and the manufacturers of building products will have to keep their plants going at maximum capacity to supply the demand.

One of the greatest hindrances to an adequate building program has been financing—where and how to obtain the money to build. Great sums of money were tied up in ventures of a purely speculative nature, which permitted the holding of stocks in warehouses, waiting for a high market, to unload. The financial institutions have been calling in these loans. The liquidation of stocks necessary to the payment of these loans has been one of the factors in the reduction of prices in some lines. Some of the money thus released will be available for financing building construction.

In other words the present outlook indicates that money will be easier in 1921 than the past year.

Now, let us examine the building material field. What has been responsible for the peak prices of 1920? (1) High wage scale and low labor efficiency. (2) High cost of fuel and irregular supply. In many cases coal purchased on contract was never delivered, causing buying in open market at extremely high prices. (3) Demoralized transportation and high freight rates. (4) Inability to operate at maximum production, placing high overhead charges on material produced; and in many cases (5) a strong demand.

In answering the question, "Will the cost of building materials come down?", we must examine the possibility of changed conditions under each of these five headings.

(1) If there is a normal building program there will be no surplus of skilled labor. Therefore, high wages are not likely to recede. Reports from practically every line indicate increased efficiency of labor and the belief that a still higher efficiency is likely, Net result, lower production costs.

(2) Cost of fuel already decreasing. Further drop possible.

(3) Reports indicate improvement in transportation, and probable increased available supply of freight cars for carrying building materials after January 1. Present high freight rates will probably remain in effect for some time. Increased use of motor trucks makes this an important factor for short haul work and will act further to improve transportation conditions.

(4) All plants should find it possible to operate on higher production level than during past year.

(5) There seems to be no doubt that there will be a strong demand.

The trend under items 1 to 4 would indicate somewhat lower prices. But against this is the law of supply and demand, with an almost certain prospect of the demand exceeding the supply.

An examination of present prices compared with those obtaining six months ago shows a decline in several lines, notably lumber, brick, asphalt roofing products, cement and some others. In some cases, since buying has been light, the stocks now in the hands of the dealer are those bought at previous high prices and in such cases, but slight reduction, if any, has so far been passed along to the ultimate consumer. In the case of lumber and asphalt roofing products, it is stated that present wholesale prices are below production costs. When such a condition occurs, either the plant shuts down or curtails its production until there is a recovery in demand, when prices again rise to a level assuring a reasonable profit. Therefore, unless several factors entering into the cost of production show marked improvement, a strong demand will at once result in an increase in such products, over those now quoted.

Summing up, it seems reasonable to assume that:

(1) More money for financing building construction will be available during 1921 than was the case during 1920.

(2) Average 1921 prices of building materials will be lower than those of 1920. In most lines peak prices are already past.

(3) For some products present wholesale prices are lower than they will be a few months later when active building starts. Money will be saved by buying now for future needs and storing at site.

(4) Labor efficiency is increasing, which includes men engaged in the building trades, thus tending to lower the cost of building.

(5) There is not likely to be any continual decline in prices throughout the year 1921. Those who wait after Spring building commences for further reductions in prices will be disappointed. The price trend will be upward after that, if it changes at all.

(6) The cost of building during the coming year will be more stable than during that just ended, permitting closer estimating.

Our advice, therefore, based on the most authoritative information obtainable, to all who contemplate building is to be ready to start work on your project at the earliest possible moment. Assure your supply of needed material now.

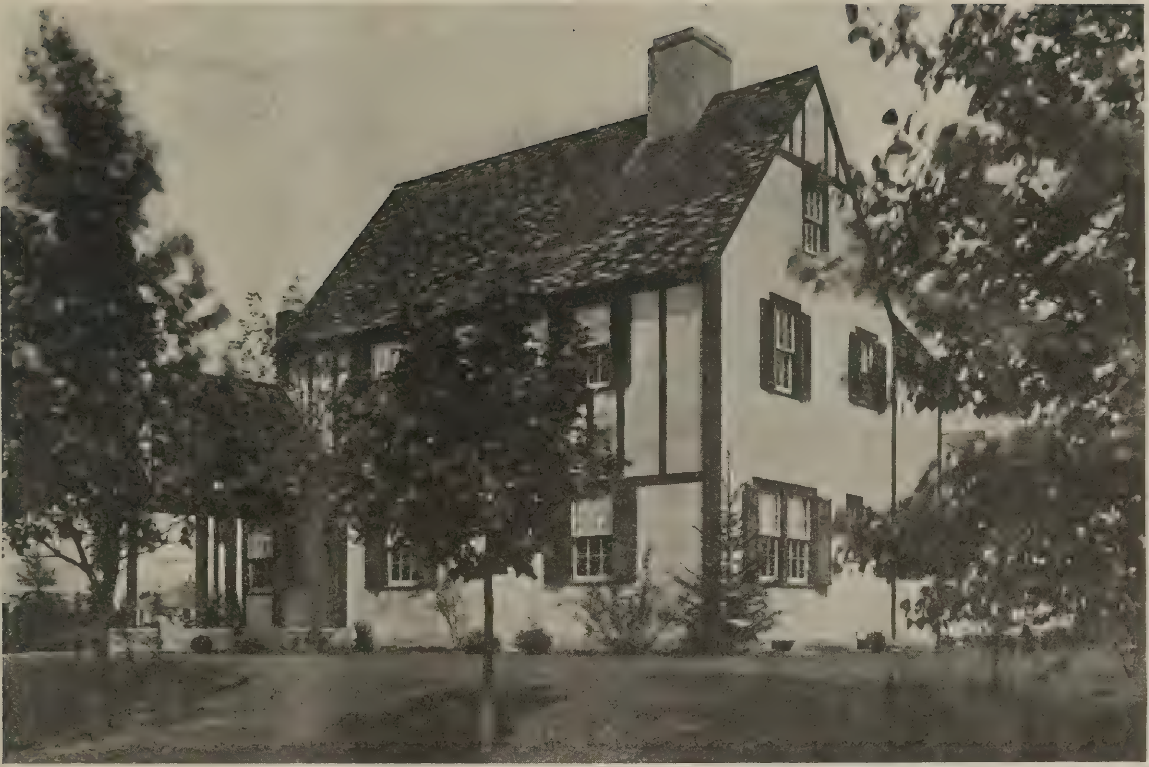
Pre-war prices will not obtain in the building industry during 1921, so don't wait for them. The sooner the building is completed, the more attractive is it from a renting standpoint, and therefore, the better as an investment.

Building Age Index for 1920

The Building Age Index for 1920 is now off the press and a copy will be forwarded to subscribers who desire it.

This Index is extensive and contains cross-references so that articles can easily be found. A copy of this Index will be most helpful to those who keep back issues.

As only a limited number of this Index is printed, if you desire a copy your request should reach us early.



"English Stucco," a Variation of the Type E House, Garden City Development
Aymar Embury, II, Architect

Building "Better Homes" at Garden City

THE many excellent examples of early American homes indicate the pride which the builders responsible for their erection as well as their owners took in their proper design. But following this Colonial period came an era of small house building, in which it would seem but scant, if any, attention was given to the artistic merit of the houses produced. So that today there exist communities all over this country where the erection of a well designed house is conspicuous among its neighbors.

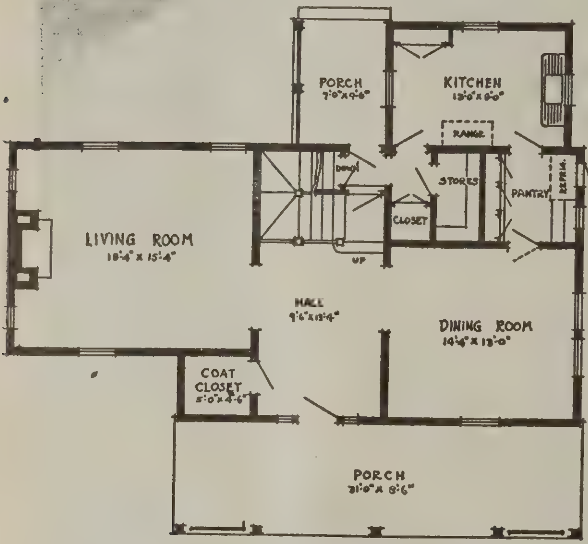
Fortunately the era of careless home building is passing, and today there is—and has been for the last few years—a noticeable trend toward improvement, not only in providing an attractive exterior, but also in the planning of truly livable houses. This tendency has reached even to very modest dwellings, so that we find excellent design becoming the general aim among builders of low cost houses. Here and there larger and more responsible concerns have entered this field and by the use of modern efficiency systems in the selection of a site, utility of plan, purchase of materials, standardization of workmanship and financing of construction and sale, have afforded the purchaser of a house that degree of excellence formerly obtained only under a "day labor—personal supervision" arrangement.

It may be but natural that with its attendant outlay of cash, careful planning and perfection of a competent organization we could not expect this movement toward "better homes" to be the leading one in the scramble to provide housing (or shelter) during the past twelve months. In many localities the necessity for providing homes quickly despite the difficulty in securing proper materials and efficient labor, has produced many houses inferior to those

---

Note—For additional illustrations of this development see pages 42, 43 and 44 of this issue.

erected during the 1912-14 period. The fact that purchasers were often forced to find shelter in the "cheapest" space obtainable in this high priced era may be accepted as the excuse, if not the logical reason why, in the development of many housing projects the ordinary rules of good planning, improved sites, standardization and economical financing were not always followed.



FIRST FLOOR PLAN

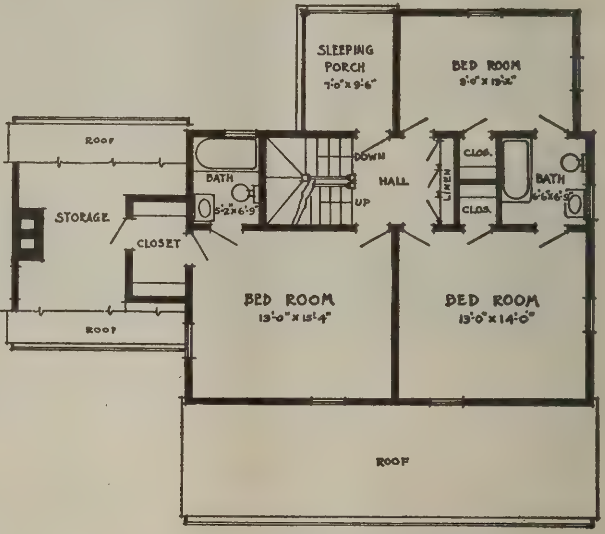
Type E House

In several of the restricted sections of Long Island, noticeably those within the commuting zone to Manhattan, the value of *better homes* has been successfully demonstrated. It is only logical that the suburban life idea which has so strongly attracted the business men of the big city, should take firmest root in established, completely restricted, residential colonies. Similar colonies exist in close proximity to practically all of our larger cities. Their future extensive development will materially aid in the solution of the present housing shortage.

Sun Porch, Type S House

A brief history of one of these projects, that at Nassau Boulevard Station, Garden City, Long Island, is herewith presented. The accompanying illustration as well as those appearing on pages 42, 43 and 44 show how successful this effort has been in advancing the "better homes" movement.

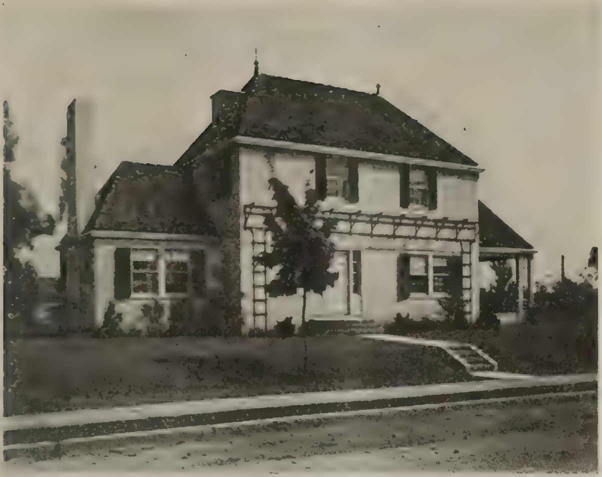
The first essential feature for a successful development of this nature—a well selected site—was there already provided. Streets were improved with light, sewer, water and gas. There was good police and fire protection, while schools, churches, clubs and social centers were convenient. This location was within 35 minutes from the heart of Manhattan, yet it was a truly suburban section.



SECOND FLOOR PLAN

Type E House

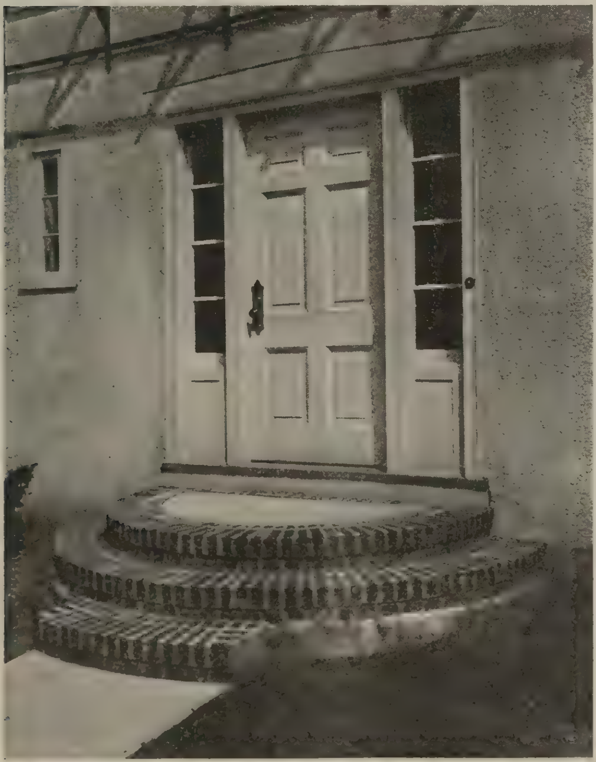
The owners of the land comprising the site of the present development joined forces with a large housing contractor. Three architects, recognized as among those foremost in suburban house planning, were retained to prepare drawings for twenty-five different houses to be constructed from a limited number of standardized types. Conferences by the builders, architects, and the sales organization resulted in the production of three distinct types, all economical in construction, artistic in design and suitable to the popular demand of prospective home owners dissatisfied with commonplace offerings. Thus the second essential feature—good planning—was accomplished without losing the most important item, i. e., standardization in purchase and handling of materials.



"French Stucco," Variation of the Type E House
Aymar Embury, II, Architect

The construction costs during the past twelve months on the first twelve houses (completed and sold prior to October 1st) were as follows:

Type E-A	$17,700
E-B	18,300
E-C	18,300
E-D	18,000
Average cost for Type E house	$18,075



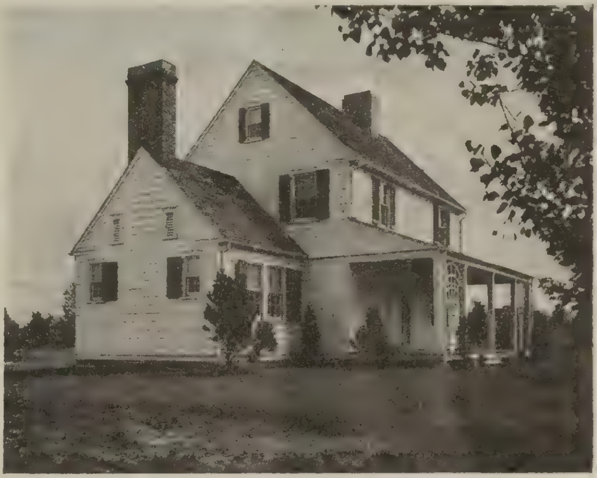
Entrance Detail of Type E House Shown Above

Type S-1	$19,250
S-2	19,000
S-3	18,100
S-4	18,250
Average cost of Type S house	$18,650

Type G-J	$18,000
G-K	18,750
G-L	18,650
Average cost for Type G house	$18,470

A large proportion of the material used on the above and the houses now under construction was purchased for cash previous to the increases of December 1st, 1919 and March 1st, 1920. The labor item on the balance of the houses will show a slight additional cost on account of increases since July 1st, 1920.

It is interesting to note that, although the exterior is varied, in each type, the average costs are approximately the same.



Colonial Cottage, a Type E House

Despite the increased material and labor costs which occurred after the plans were adopted, the architect's specifications were strictly adhered to, except in one small item, i. e., that of electric lighting fixtures, those installed being of excellent quality but of a slightly less costly grade than originally specified. In order to appreciate the excellence of materials and workmanship adhered to in the erection of these houses, as compared with the all too common "skimped" speculative house, a few items of the specifications are worthy of mention, viz:

Monolithic poured concrete foundation walls 12 in. thick.

Concrete cellar floors 6 in. thick.

In cellar, plastered ceilings and enclosed sections.

Three coat plaster work throughout.

Special rust resisting metal instead of ordinary galvanized, for gutters, leaders, flashings.

Metal weather strips and copper screens for all doors and windows.

From two to three tiled bathrooms in each house.

Kitchen range and instantaneous hot water heater.

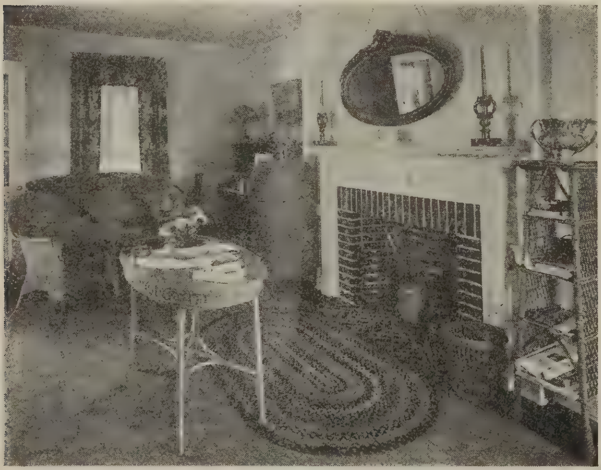
Dining Room, Type S House

Window shades, lighting fixtures and interior decorations complete, and of excellent quality.

For the stucco finished houses, the stucco is on metal lath. The heating system in all houses consists of a two pipe hot water system.

When completed, such a building represents, in every respect, a home ready to move into just as the owner would build for his own permanent occupancy, provided he thoroughly understood building.

The third essential feature—financing the project —was successfully accomplished due to the very nature of the proposed development. The mortgage companies advancing money gave due appreciation to the value of site and plan and the fact of wholesale purchase of material, as well as the cash purchasing power of the home buyers attracted by such "better homes."



Living Room, Type S House

Actual work on this project commenced in the Fall of 1919, the plan being to erect 24 houses the first year. Today at the close of 1920, eighteen houses have been entirely completed—ready for occupancy—and of these 15 have been sold. The remaining six houses are 95 per cent. completed.

In general these houses were progressed four at a time (except where a sale necessitated rush on a certain one in particular). About forty men were constantly employed on the work. Individual labor units in certain classes of work were moved around on the job where needed.

Stair Hall, Type S House

The plots, usually 80 x 100 (4 lots) or 100 x 100 (5 lots) were graded, sown in grass and shrubbed to conform to the landscape improvements of the older adjacent property.

The Garden City Development Company, who is responsible for this work, is at present arranging for the erection of twenty-five additional houses during 1921, to be built on three or four different basic types, including bungalow designs. Their experience has shown that the class of prospects and purchasers attracted to these houses consists mainly of those persons who, for a long time, have been "planning" to purchase a restricted plot and build a "real home" according to their own plans. Engaged in the pursuit of their own business or industry, they have hesitated to devote the necessary time and attention to the task, or they have deliberately procrastinated, waiting for the cost of building to come down.

Variation of Type S House (Rear View)
See Page 42 for Front View of Type S House

In the meantime, their annual rental charges in apartments and hotels have been increasing by leaps and bounds, while the improved commuting service out of Manhattan has been continually "luring" them to the freedom and advantages of suburban life. Such persons have often been the plaything of profiteering landlords, in many cases former rentals being doubled or even tripled until the average rentals have amounted to $2,400 or more per annum, with additional charges for automobile storage.

On an equal or less total annual expenditure the home purchaser effects a very large saving *at present day prices*. The following figures show that while the annual expenditure may equal the amount he is now forced to pay as rent, yet this includes an actual saving of over one thousand dollars annually. In addition he is enjoying a home vastly superior to that for which he is paying rent.

As an example consider a house, plot and garage sold for, say, $20,000.

Carrying charges—classed as equivalent to rental:	
Interest of 6% on mortgage aggregating $14,000 (reducing each year)	$840
Taxes	200
Water and insurance	60
Coal (1920)	200
Total	$1,300
Investment—classed as saving:	
Reduction payments, 2nd mortgage	$1,100
Total annual charges	$2,400

which represents a payment of $108 monthly chargeable as rental, while the balance, say, $92 per month, is clear saving.

It is thus readily seen that having better homes "ready for occupancy" affords a good opportunity for both builder and purchaser. Such houses almost sell themselves, whereas partially completed buildings require much explanation—pictures of how it will look (or ought to look) when completed, and often subsequent disappointment.

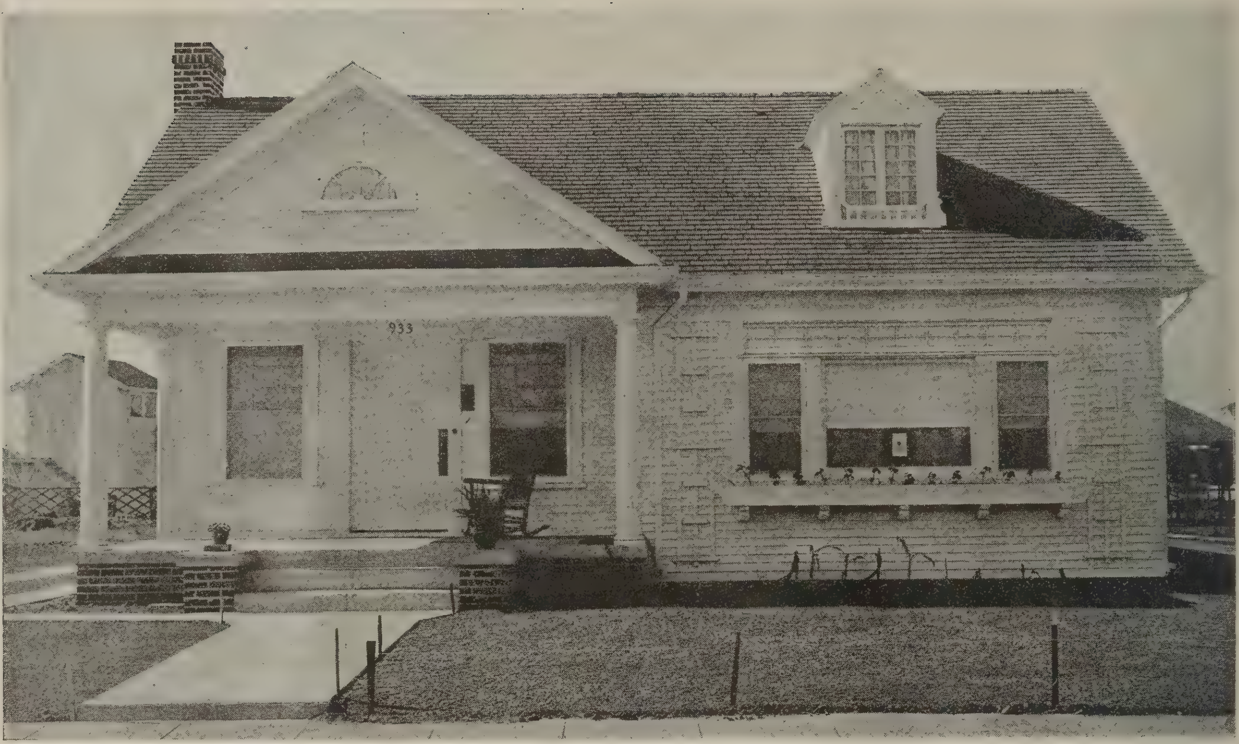
The service of the company in taking care of the small troubles of a "new" home, has been an additional drawing card and one that is very satisfactory to the purchaser and in houses so well built represents but a trivial expense to the seller. This is a feature worth adopting in similar developments.

The wholesale purchase of rough but seasoned lumber for the operation, the delivery of same to private railroad siding on property, the erection of a small mill for turning out the finished product and the operation of the job from a field office all tended toward holding down construction costs.

One year ago this journal urged upon its readers the gospel of "Build Now." We deprecated talk of lower prices, since our investigations showed the futility of such talk. Many took our advice early and are thankful—others procrastinated and are sorry. We have here presented a concrete example of what has been done by one company, who felt "Build Now" was sound advice a year ago. These twenty-four houses have been built and well built according to excellent designs. Within a short time after these lines are read the last of these will probably have been sold, and the books of this concern show a balance on the right side.

Side View. Variation Type E House

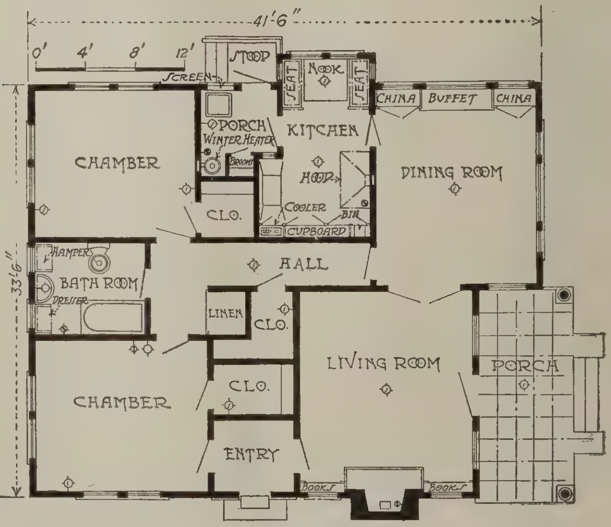
It is hoped that this article may prove an inspiration to other builders to go and do likewise and to convince prospective home builders that under present conditions it is good business to "Build Now."



House of K. C. Atwood, Los Angeles, Cal. Designed and Built by the De Luxe Building Company

A Colonial Bungalow in California

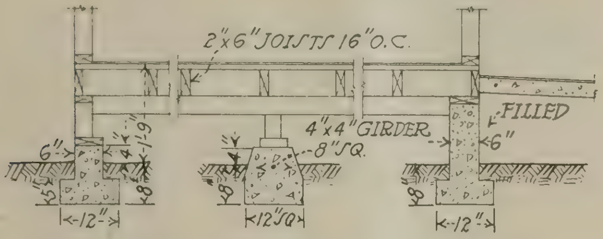
TO those who live in Los Angeles, the city where the bungalow may be said to have first been given serious consideration in design, this house will not be considered remarkable. There are undoubtedly many more pretentious and many more artistically designed. But standing by itself, as it here appears, there is no relative comparison, and we may judge it absolutely on its merits. It has many. If a home means a place where one may live with self-respect, contentment, and a certain pride of possession, then this unpretentious structure will afford all of these essential things. The reason we are writing so much about this house is because it shows a skillful and artistic adaptation of material unusual in the low cost house. It is a sermon, inasmuch as it teaches that even the small house may be as carefully considered and as successfully evolved as the largest. Some one, writing of architecture, has truthfully said that the architect should set his palette of materials exactly to produce color as does the artist painter, while in studying the form and proportion he might follow along the methods of the sculptor.



FLOOR PLAN

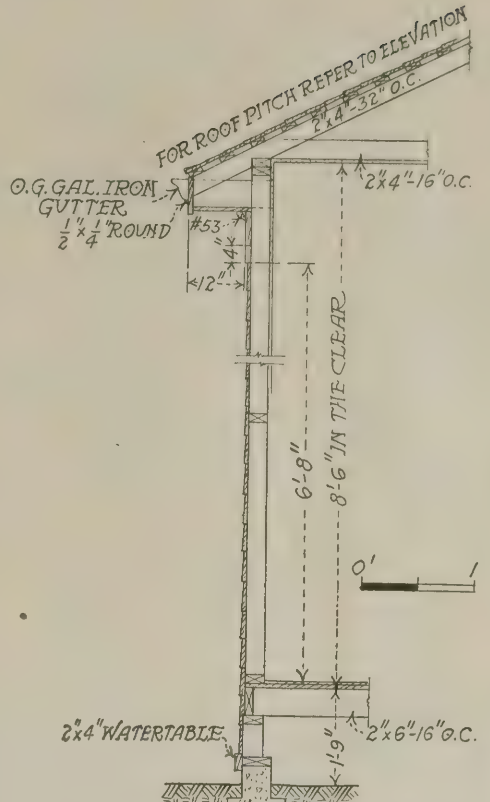
Materials need not be costly to lend themselves to an artistic result. Even the "cull pile" at brickyards has been known to supply the means for effects that have led to our present improvement in face brick.

The wooden house, as every one knows who has studied our early Colonial types, may become a beautiful structure. Let us study this little house that we may learn how good, well-directed carpentry, a fine sense of correct proportion may create even in so humble a structure a most satisfying result. Note the inviting aspect of the porch, and the broad doorway that leads within. There is a fine sense of hospitality expressed. Then there is the well related and balanced large window that correctly balances the space it occupies. The dormer on the roof, with its miniature balustrade affording a structural space for

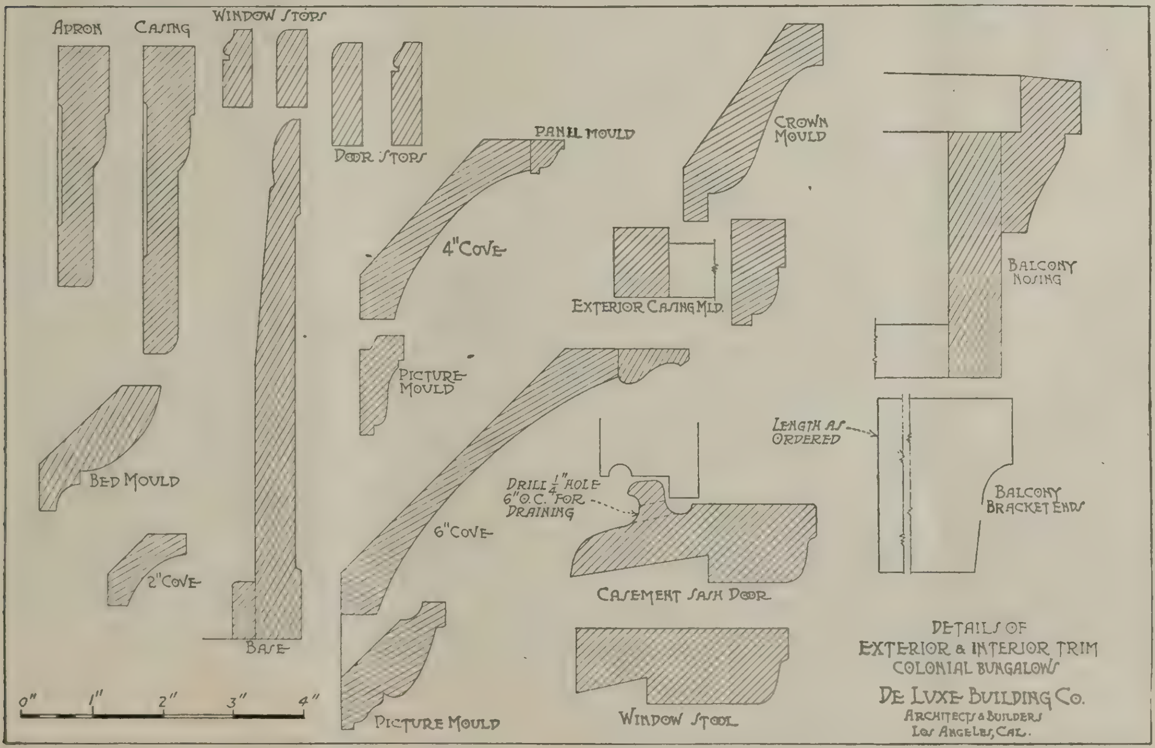


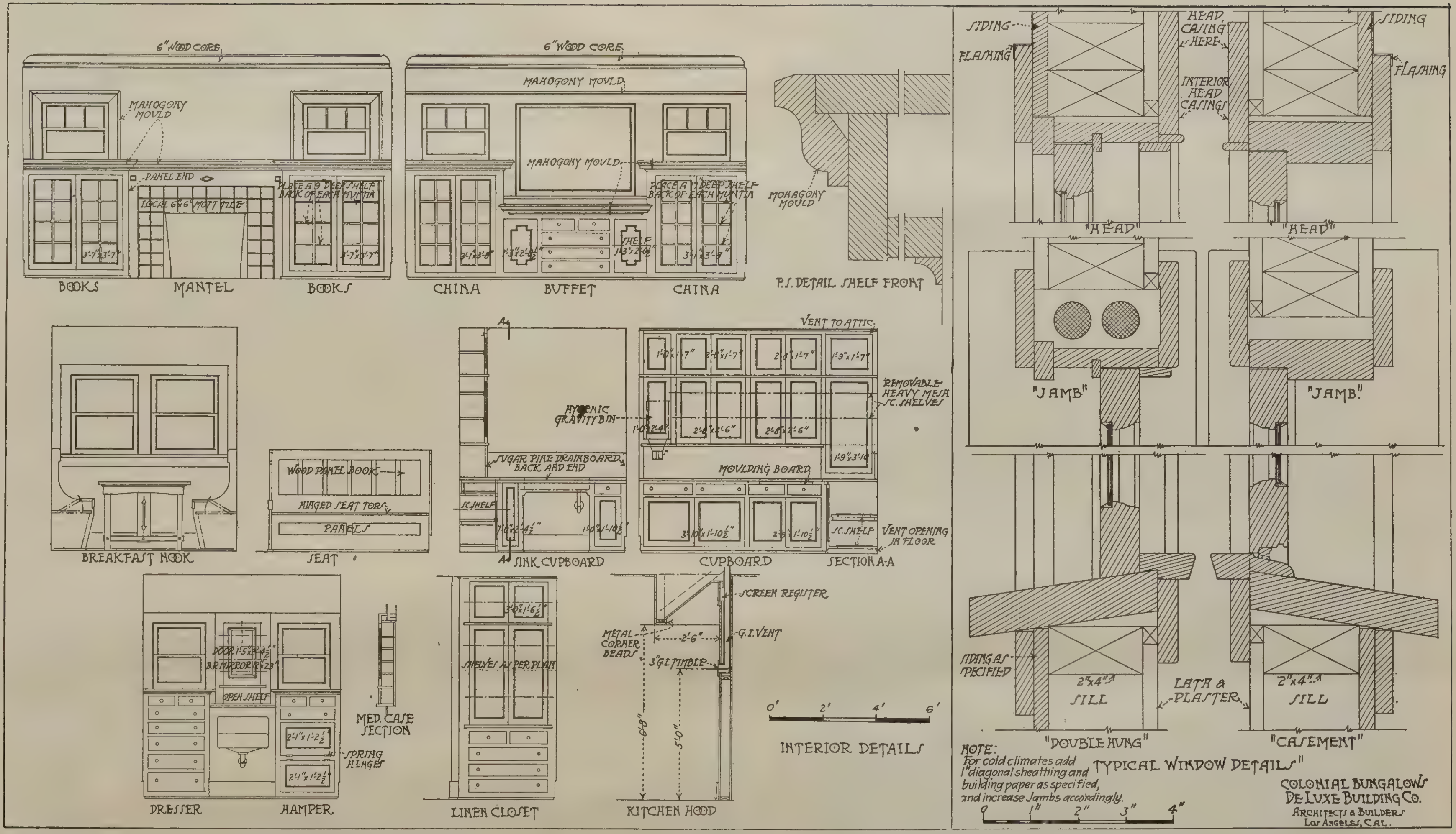
SECTION A-A TYPICAL PIER SECTION B-B

FOUNDATION DETAILS



TYPICAL SECTION (B-B)





Details of Built-in Furniture and Typical Window Details. House of K. C. Atwood, Los Angeles, Cal.

Designed and Constructed by the De Luxe Building Company window gardening, is most excellently done. Its proportions are good, and the casement windows large enough to give ample light and ventilation to this upper room.

The whole effect is one of good craftsmanship, good design and excellent proportion and, as stated as the outset, it is a home where one may spend those hours apart from daily toil in contentment.

The plan is essentially Californian, but with only slight changes could admirably be made to suit any climate.

The accompanying details further show that the same careful and skillful thought has been given to the interior as is shown on the exterior.

An attractive interior feature of this house is the built-in furniture. There can be no doubt that well designed furniture of this permanent character is at the outset the most economical and the most satisfactory method of supplying the main details of furnishing.

Conforming as it will to the motive of the design of the interior in which it is placed, it is always harmonious. It creates a certain "hominess" in an interior, a sense of fixed habitation. As a space saving method there is none better. The well designed window seat provides a box to store many things of daily use. Bookcases and cupboards all have their stated uses. Sideboards built in are far better than the movable type. They may be designed to reach from floor to ceiling, and the housewife will find in the well designed nooks and corners appropriate places for silver, the table linen, and in the closets overhead and at sides a lodgment for the cherished pieces of china and glass.

Built-in furniture is not as commonly found in low cost houses as it should be. Those who are familiar with the low cost English country roadside house will recall the attractiveness of interiors that are the result of generations of effort in providing utilities of built-in furniture. The homelike atmosphere of all these many things is undeniable. We should have more of them in this country.

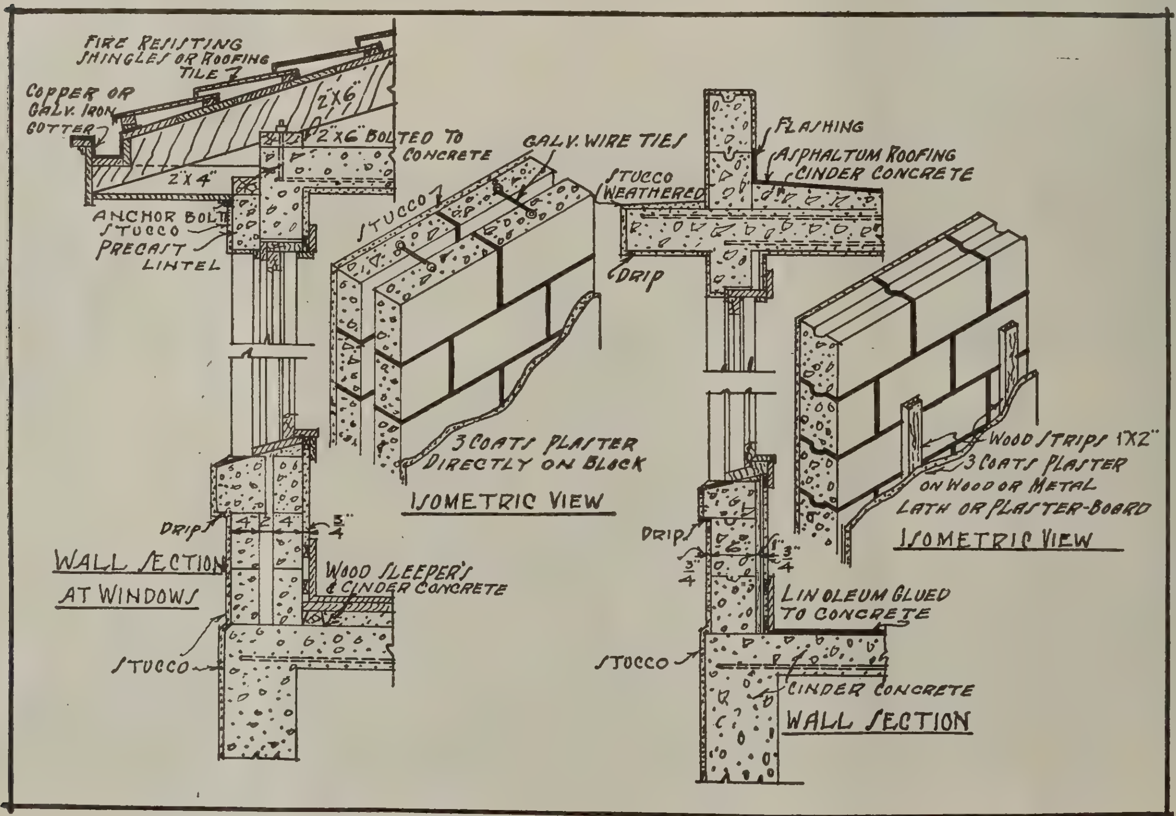
Rear View, House at Summit, N. J.
Howard Major, Architect
For Front View and Plans See Page 41

Building With Concrete Blocks

EVERY legitimate building material is going to be called upon to play its part in the effacement of our greatest national deficit—*over one million homes.*

The ability to make intelligent use of any building material requires a familiarity with both its properties and the methods of its proper incorporation into the structure. Concrete block is no exception to the rule. It is unfortunately true that in many instances this material has been tried and later rejected, due to blocks of poor quality, improperly manufactured, having been supplied, but at present a number of concrete block manufacturers are endeavoring to maintain a proper standard of excellence for their material. Blocks of the proper quality can be obtained from reputable manufacturers.

Concrete block and tile laid in Portland cement mortar are particularly well adapted to serve as a backing for Portland cement stucco because they are composed of the same class of material as the stucco itself and afford an excellent bonding surface. For Portland cement stucco finish the block or tile should be rough and of coarse texture, but not weak or friable. In applying the stucco to block or tile the joints should be raked out or cut back at least even with the face of the wall; no projections should be left. The wall should be brushed free from all loose particles and wet down. It should be moist at the time the stucco is applied, since if dry, the moisture will be absorbed from the stucco and a weak finish will result, while if too wet the film of water will prevent proper bond.

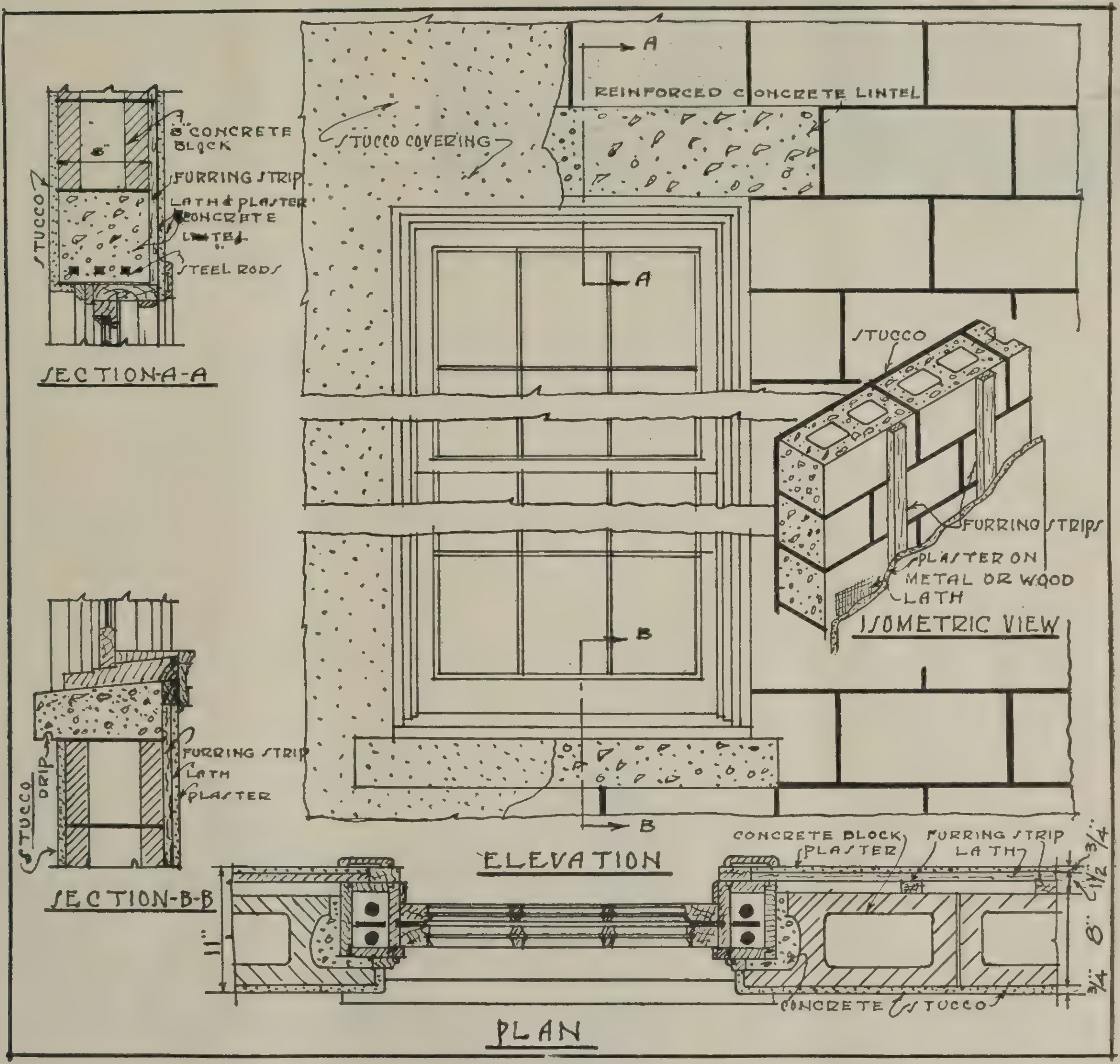


Details of Construction—Stucco on Concrete Block
At Left—Double Walled Type. Inner and Outer Shells Connected by Metal Ties Only
At Right—Solid Block of "Book Tile" Type. Interior Furring Necessary

Naturally good walls are impossible unless the blocks on which the stucco surface is to be placed are of proper quality and strength. The standard adopted by the American Concrete Institute is an excellent guide to follow.

Limit of Loading.—According to these standards the load on any hollow walls of concrete block, including the superimposed weight of the wall, should not exceed one hundred and sixty-seven lbs. per sq. in. of gross area. If the floor loads are carried on girders or joists resting on concrete block pilasters filled in solid with slush concrete mixed in proportion of 1 part cement, not to exceed 2 parts of sand and 4 parts of gravel or crushed stone, the pilasters may be loaded not to exceed 300 lbs. per sq. in. of gross cross-sectional area.

Solid walls built of architectural stone, block or brick and laid in Portland cement mortar or hollow block walls filled with concrete should not be loaded to exceed 300 lbs. per sq. in. of gross cross-sectional area.



Details of Construction—Stucco on Common Type of Concrete Block

Wherever girders or joists rest upon walls in such a manner as to cause concentrated loads of over 4,000 lbs., the block supporting the girders or joists should be made solid for at least eight inches from the inside face of the wall except where a suitable bearing plate is provided to distribute the load over a sufficient area to reduce the stress to proper limits.

An Attractive House Constructed with Walls of Concrete Block and Stucco Finish

If the combined live and dead floor loads exceed 60 lbs. per sq. ft., the floor joists should rest on a steel plate not less than three-eighths of an inch thick and of a width one-half to one inch less than the wall thickness. In lieu of a steel plate the joists may rest on a solid block which may be three or four inches less in wall thickness than the building wall, except in instances where the wall is eight inches thick, in which cases the solid block should be the same thickness as the building wall.

Thickness of Walls.—Walls of residences and buildings commonly known as apartment buildings, not exceeding four stories in height, in which the dead floor load does not exceed 60 lbs., or the live load 60 lbs. per sq. ft., should have a minimum thickness in inches as shown in the following table:

Thickness in inches for concrete block walls:

No. of stories	Basement	First story	Second story	Third story	Fourth story
1	8	8	. .	. .	. .
2	10	8	8	. .	. .
3	12	12	10	8	. .
4	16	12	12	10	8

Wherever walls are decreased in thickness the top course of the thicker wall should afford a solid bearing for the webs or walls of the course of the concrete block above.

Mortars.—Unless carefully made, mortar joints are likely to be the weakest portions of a concrete block or tile wall. The essentials of a good mortar joint are:

1. It should be dense and nonabsorbent.
2. It must have a sufficient compressive strength to withstand pressure in the wall without crushing.
3. It must attain strength rapidly.
4. It must be reasonable in cost and easily obtainable.
5. It must possess good working qualities.
6. It should look satisfactory.
7. It should endure permanently.

Portland cement mortar meets these requirements and should be specified for concrete block and tile wall construction. Usually hydrated or well slaked lime is added, and in quantities up to 10 per cent. will not decrease the strength of the mortar to any extent, if at all, and will add to its working qualities.

Among masons there is a wide variation in the ratio of cement and sand used in making mortar; some prefer as rich a mixture as equal parts of cement and sand, while others use a mortar containing three times as much sand as cement. A proportion of 1 sack of cement to 2 cubic feet of sand will be found satisfactory under most conditions. A mixture containing in excess of 3 cubic feet of sand for each sack of cement is not recommended. Hydrated or slaked lime may be added to the mortar in an amount not to exceed 25 per cent. by volume of the amount of cement in the mixture.

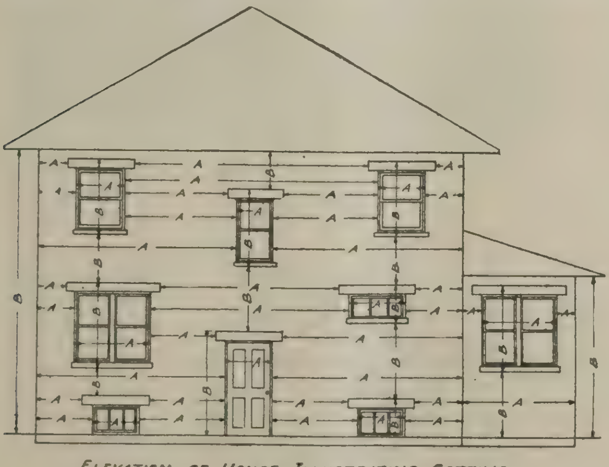
Mixing.—The usual method is to mix the cement

Walls Being Constructed of the Interlocking Type of Concrete Block and sand dry until the resulting mixture is uniform in color and of like character throughout. Hydrated lime may be incorporated in the mixture simultaneously with the cement and sand. When lime putty (slaked lime) is used it is customary to dissolve the putty to a creamy consistency in water and then use this lime water when mixing the mortar. The mortar may be either mixed by hand or by mechanical means. The use of mechanical mixers is increasing and these give very satisfactory results. Only as much water should be added as will, after thorough mixing, produce a mixture of such plasticity as will work to best advantage.

TABLE II

TABLE SHOWING RELATION BETWEEN NUMBER OF COURSES OF CONCRETE BLOCK AND TILE AND THE HEIGHT OF WALL FORMED BY UNITS OF DIFFERENT SIZES

Number of Courses	Height of Wall Sections Formed							
	3 In. Block	4 In. Block	5 In. Block	6 In. Block	8 In. Block	9 In. Block	10 In. Block	12 In. Block
	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
1	0 3	0 4	0 5	0 6	0 8	0 9	0 10	1 0
2	0 6	0 8	0 10	1 0	1 4	1 6	1 8	2 0
3	0 9	1 0	1 3	1 6	2 0	2 3	2 6	3 0
4	1 0	1 4	1 8	2 0	2 8	3 0	3 4	4 0
5	1 3	1 8	2 1	2 6	3 4	3 9	4 2	5 0
6	1 6	2 0	2 6	3 0	4 0	4 6	5 0	6 0
7	1 9	2 4	2 11	3 6	4 8	5 3	5 10	7 0
8	2 0	2 8	3 4	4 0	5 4	6 0	6 8	8 0
9	2 3	3 0	3 9	4 6	6 0	6 9	7 6	9 0
10	2 6	3 4	4 2	5 0	6 8	7 6	8 4	10 0
11	2 9	3 8	4 7	5 6	7 4	8 3	9 2	11 0
12	3 0	4 0	5 0	6 0	8 0	9 0	10 0	12 0
13	3 3	4 4	5 5	6 6	8 8	9 9	10 10	13 0
14	3 6	4 8	5 10	7 0	9 4	10 6	11 8	14 0
15	3 9	5 0	6 3	7 6	10 0	11 3	12 6	15 0
16	4 0	5 4	6 8	8 0	10 8	12 0	13 4	16 0
17	4 3	5 8	7 1	8 6	11 4	12 9	14 2	17 0
18	4 6	6 0	7 6	9 0	12 0	13 6	15 0	18 0
19	4 9	6 4	7 11	9 6	12 8	14 3	15 10	19 0
20	5 0	6 8	8 4	10 0	13 4	15 0	16 8	20 0
21	5 3	7 0	8 9	10 6	14 0	15 9	17 6	21 0
22	5 6	7 4	9 2	11 0	14 8	16 6	18 4	22 0
23	5 9	7 8	9 7	11 6	15 4	17 3	19 2	23 0
24	6 0	8 0	10 0	12 0	16 0	18 0	20 0	24 0
25	6 3	8 4	10 5	12 6	16 8	18 9	20 10	25 0
26	6 6	8 8	10 10	13 0	17 4	19 6	21 8	26 0
27	6 9	9 0	11 3	13 6	18 0	20 3	22 6	27 0
28	7 0	9 4	11 8	14 0	18 8	21 0	23 4	28 0
29	7 3	9 8	12 1	14 6	19 4	21 9	24 2	29 0
30	7 6	10 0	12 6	15 0	20 0	22 6	25 0	30 0
31	7 9	10 4	12 11	15 6	20 8	23 3	25 10	31 0
32	8 0	10 8	13 4	16 0	21 4	24 0	26 8	32 0



ELEVATION OF HOUSE ILLUSTRATING SETTING OF CONCRETE BLOCK.

Fig. I—Illustrating Application of Tables II and III

It is best to mix only a small batch of mortar at a time (say, enough for 30 minutes' work). Mortar which has stiffened must not be remixed with water to impart to it workable qualities again. This process is commonly referred to as "retempering." It should not be permitted.

Application.—In laying the block it is essential

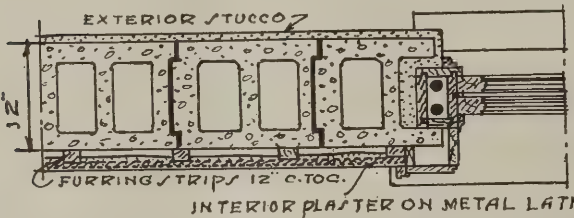
TABLE III

TABLE SHOWING NUMBER OF BLOCK REQUIRED FOR WALL SECTION OF VARIOUS LENGTHS

Number of Block and Fraction of Block	Length of Wall Sections							
	12-inch Block		16-inch Block		20-inch Block		24-inch Block	
	Feet	Inches	Feet	Inches	Feet	Inches	Feet	Inches
1	1	0	1	4	1	8	2	0
1¼			1	8	2	1	2	6
1½	1	6	2	0	2	6	3	0
1¾			2	4	2	11	3	6
2	2	0	2	8	3	4	4	0
2¼			3	0	3	9	4	6
2½	2	6	3	4	4	2	5	0
2¾			3	8	4	7	5	6
3	3	0	4	0	5	0	6	0
3¼			4	4	5	5	6	6
3½	3	6	4	8	5	10	7	0
3¾			5	0	6	3	7	6
4	4	0	5	4	6	8	8	0
4¼			5	8	7	1	8	6
4½	4	6	6	0	7	6	9	0
4¾			6	4	7	11	9	6
5	5	0	6	8	8	4	10	0
5¼			7	0	8	9	10	6
5½	5	6	7	4	9	2	11	0
5¾			7	8	9	7	11	6
6	6	0	8	0	10	0	12	0
6¼			8	4	10	5	12	6
6½	6	6	8	8	10	10	13	0
6¾			9	0	11	3	13	6
7	7	0	9	4	11	8	14	0
7¼			9	8	12	1	14	6
7½	7	6	10	0	12	6	15	0
7¾			10	4	12	11	15	6
8	8	0	10	8	13	4	16	0
8¼			11	0	13	9	16	6
8½	8	6	11	4	14	2	17	0
8¾			11	8	14	7	17	6
9	9	0	12	0	15	0	18	0
9¼	9	3	12	4	15	5	18	6
9½	9	6	12	8	15	10	19	0
9¾	9	9	13	0	16	3	19	6
10	10	0	13	4	16	8	20	0
10¼	10	3	13	8	17	1	20	6
10½	10	6	14	0	17	6	21	0
10¾	10	9	14	4	17	11	21	6
11	11	0	14	8	18	4	22	0
11¼	11	3	15	0	18	9	22	6
11½	11	6	15	4	19	2	23	0
11¾	11	9	15	8	19	7	23	6
12	12	0	16	0	20	0	24	0
12¼	12	3	16	4	20	5	24	6
12½	12	6	16	8	20	10	25	0
12¾	12	9	17	0	21	3	25	6
13	13	0	17	4	21	8	26	0
13¼	13	3	17	8	22	1	26	6
13½	13	6	18	0	22	6	27	0
13¾	13	9	18	4	22	11	27	6
14	14	0	18	8	23	4	28	0
14¼	14	3	19	0	23	9	28	6
14½	14	6	19	4	24	2	29	0
14¾	14	9	19	8	24	7	29	6
15	15	0	20	0	25	0	30	0
15¼	15	3	20	4	25	5	30	6
15½	15	6	20	8	25	10	31	0
15¾	15	9	21	0	26	3	31	6
16	16	0	21	4	26	8	32	0
16¼	16	3	21	8	27	1	32	6
16½	16	6	22	0	27	6	33	0
16¾	16	9	22	4	27	11	33	6
17	17	0	22	8	28	4	34	0
17¼	17	3	23	0	28	9	34	6
17½	17	6	23	4	29	2	35	0
17¾	17	9	23	8	29	7	35	6
18	18	0	24	0	30	0	36	0

that a good bond between the mortar and the block be obtained. To accomplish this end, mortar should be applied with force. For best results both ends of the block should be buttered. The horizontal or supporting sections of the block should be entirely covered with mortar.

Waterproofing the Foundation.—A dry basement is one of the requirements of good construction. When the site on which the house is to be located does not have good natural drainage, it is best to waterproof the outsides of the walls below grade. No matter how much care is exercised in making concrete block or placing them in the wall it is not always possible to obtain absolutely watertight construction.



Detail of Window Jamb Construction for 12-Inch Block

The simplest method of waterproofing is to paint the wall with hot pitch or asphalt. When this method is adopted the precaution must be taken to have the wall dry, as these materials will not adhere to a moist surface. Lines of drain tile should be laid around both the outside and inside of the wall footings and at least 6 inches below them to carry off excess water. These tiles should be connected to a suitable outlet drain. The subject of waterproofing is more fully treated in another article in this issue.

Sills and Lintels.—To make sure that no moisture penetrates the walls at the sills, lintels, sill courses, lintel courses and joint courses and to prevent condensation on the inside walls at these places, all building trim should be of two-piece construction so as to provide an air space between the inner and outer sections. The space between the inner and outer sections need not be greater than ¼ inch; a continuous air space is all that is required. Each division of lintel should be reinforced according to standard methods to carry the superimposed load.

Interior Plastering.—Some concrete block enthusiasts have recommended that plaster be applied directly to the block surface. These recommendations have been made despite the fact that it is customary to furr out the plaster for all kinds of masonry houses. Furring and lathing cost only slightly more when considering the total cost of the house and this assures a warmer wall. The better insulation thus provided effects a considerable saving in the winter coal bills and provides a house which is cool in summer. In no case should plaster be applied directly on the concrete surface unless the house is constructed according to the following specifications:

> The wall shall be constructed of two-piece block, providing a continuous air space from the footing to the eaves and entirely around the building. All sills and lintels shall be of the two-piece type and the inner and outer sections shall be separated so as to provide a clear air space between them. The outside of the foundation below grade shall be waterproofed as hereinbefore described.

Size of Blocks.—A tabulation of sizes of block and tile as now manufactured, is shown in Table I compiled by Sub-Committee B, National Conference on Concrete House Construction. The name of the manufacturer is followed by the width, height and length of unit, the actual size of the block or tile being given. For instance, a block listed as 8" wide, 7¾" high, and 15¾" long, is ordinarily referred to in practice as an 8" x 16" block. These units are purposely made smaller to allow for the mortar joint which, when added to length and height, produces a unit of full length and height.

As a help to the designer in determining the most desirable distance horizontally between doors and windows to corners, and also the most desirable widths of door and window opening, Table II has been prepared. Lengths of wall sections and door and window openings, should be, as far as possible, multiples of quarter blocks. Table II gives the length of wall sections of from one or eighteen units by ¼ units. A quarter length is believed to be as small a fraction of a unit as is necessary or desirable and manufacturers of molds should adapt their machines and furnish suitable division plates for making ¼, ½, and ¾ length blocks. By careful design it is often possible to get along with two sizes of units—the full length and the half length units.

A Wall Being Constructed of the Usual Type of Concrete Block

The purpose of Table III is similar to that of Table II. It is intended to help the designer determine the most suitable height for door and window openings and other vertical wall heights.

To explain the use of Tables II and III a drawing (Fig. 1) of a house elevation is presented. The distance "A" corresponds to the wall lengths shown in Table II and the distance "B" to heights specified in Table III. The purpose of both tables is to assist the designer in laying out the house so as to require no cutting of block, which is costly.

TABLE I.

STANDARD CONCRETE BLOCK AND TILE SIZE.

Manufacture of Mold.	Height, inches	Width, inches	Length, inches
Anchor Concrete Machinery Co., Grand Rapids, Iowa..........	7 11/16	8-9-10-11-12	15 11/16 & 23 11/16
Bradstad Conc. Machy. Co., Canton, S. Dak...	7¾	10	23¾
The Brandell Co., Cincinnati, Ohio..........	7¾	4-6-8-10-12	15¾
Ideal Concrete Machinery Co., Cincinnati, O.	7¾	4-6-8-10-12	15¾-23¾
The Hamilton Concrete Machinery Co., Cleveland, Ohio............	5	4-6-8-12	8-10-12
The Anchor Conc. Mach. Co. (Hobbs), Columbus, Ohio............	3 to 12 ins.	3 to 12 ins.	3 to 24 ins.
The Besser Manufacturing Co., Alpena, Mich.	7¾	7¾-9¾-11¾	15¾
Flexo Concrete Mold Co., Cedar Rapids, Iowa...	5⅝-7⅝	8-10-12	15⅝-23⅝
Zagelmeyer Cast. Stone Block Mach. Co., Bay City, Mich............	7 5/16	8-10-12	15 5-16-23 5-16
Federal Cement Product Co., Cleveland, Ohio..	5	8½-12½-16⅞	12
Ferguson Snystone Co., Denver, Colo.........	11⅝	8-12	23⅝
Helm Brick Machine Co., Cadillac, Mich........	7¼	10	23¼
Hydro Stone Co., Chicago, Ill..............	8⅝-11⅝	4½ to 17	23⅝
Multiplex Conc. Mach. Co., Elmore, Ohio....	3⅝-5⅝-7⅝	8-10-12	19⅝
Peters Eastman Greer Co., Indianapolis, Ind.	3 to 6 by ins.	7-10	20
Century Cement Machine Co., Rochester, N. Y...	4 to 16 by ins.	4 to 20 by ins.	4 in. to 6 ft.
W. E. Dunn Mfg. Co., Holland, Mich.........	7¾	8-10-12	15¾
Francis Concrete Machy. Co., St. Louis, Mo....	7¾	8-10-12	15¾-23¾
The Hayden Auto Block Mach. Co., Columbus, Ohio	7¾	4-6-8-10-12	.5¾-19¾-23¾
Northwestern Steel & Iron Works, Eau Claire, Wis...........	7¾	9-12	23¾
Pettyjohn Co., Terre Haute, Ind............	7¾	7¾	15¾-19¾-23¾
Republic Iron Works, Tecumseh, Mich......	7¾	2-4-8-10-12	15¾
Stewart Mfg. Co., Waterloo, Iowa..........	7¾	8-10	15¾

Corner block, joist blocks, sills, lintels, and other special shapes should be furnished by the concrete products manufacturer so as to make possible for the contractor to erect the building complete. Nothing detracts more from the appearance of a structure than poorly made and improperly fitted building trim. It has been suggested that jamb block be used next to all doors and windows in place of the block with an ordinary end.

The question has arisen as to the best method for designating sizes of block, and it is recommended that the height, width and length be specified.

Building Operations in November

A marked decline for November in the building industry resulted from the combined effect of the buyers' strike in the building field and the usual tendency to slacken up on building operations on the approach of winter. However, the money value of contracts awarded during the first eleven months of 1920 has amounted to 5 per cent. more than the amount for the first eleven months of 1919. Projected work in November was more than double the amount of contracts awarded. The present slump is a serious one, but the demand for building promises increased activity in 1921.

The New England district shows an increase of 4 per cent. over the October figure, with a total of $18,689,000. Public works and utilities first in importance (34 per cent.) and business buildings lowest (13 per cent.). Projected work for the year is over $200,000,000 in excess of contracts awarded, indicating considerable deferred construction.

New York State and Northern New Jersey building contracts for November amounted to $29,514,000, a decline of twenty millions from the October figure. Residential buildings highest (36 per cent.) and business buildings lowest (12 per cent.). Contracts awarded for first eleven months of 1920 totaled 83 millions more than that period in 1919. Projected work has been $325,000,000 in excess of contracts awarded.

The Middle Atlantic States' total for November was $12,711,000, two millions less than the October figure. Twenty-four per cent. for residential buildings (highest), and 14 per cent. for public works and utilities (lowest). Projected work for the month was three times work awarded.

A decided slump was shown in the Pittsburgh district, the total of $18,261,000 being about half the October figure. Business buildings constitute the lowest item, and residential buildings the highest. Projected work for year is $180,000,000 in excess of contracts awarded.

A 6 per cent. decline was shown in the Central West, the total of $47,977,000 indicating large amount of work in abeyance. Industrial buildings were highest, with 38 per cent. of total; residential buildings lowest, with 15 per cent. of total.

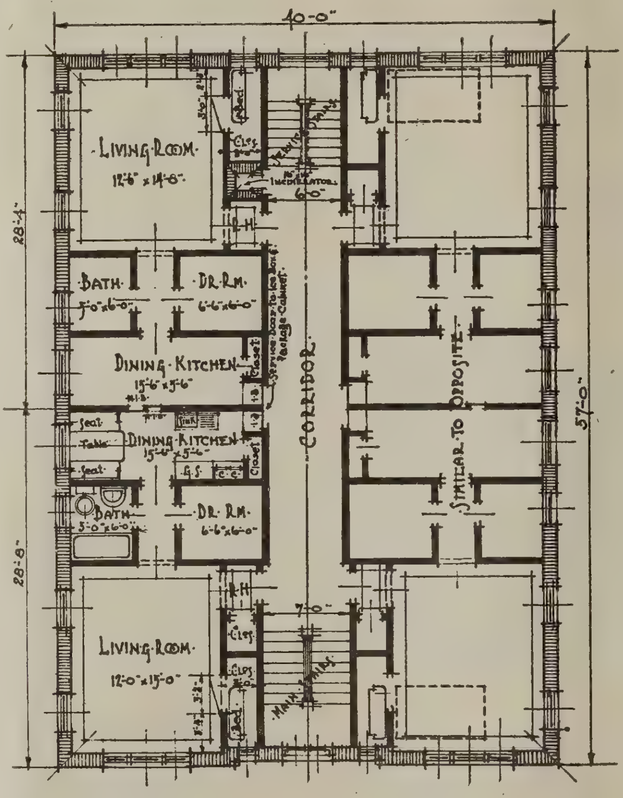
The Northwest district showed a 50 per cent. decline from October, and contracts awarded to date are only half the projected work. The total was $3,039,000, with social and recreational projects first (29 per cent.).

The Pacific Coast appears to continue to lead in building operations. California especially stands very high, its total gain for the month as compared to November, 1919, being over 800 per cent. San Francisco and Los Angeles are the only two large cities in the United States which show an increase.

Moderate Size Apartment Houses Prove Good Investments

By *Herbert C. Crocker*

MODERATE sized apartments—those with capacity for an even dozen families—built in two-room construction with efficiency of four, are proving a real bonanza in Kansas City, Mo. Besides helping to a great extent in solving the housing problems of the city, they are an excellent financial investment. Sixteen such buildings along the general design shown in the illustrations have recently been completed in Kansas City, and they provide places of shelter for a total of 192 families.



Typical Floor Plan of Twelve-Apartment Building

As a proposition for leasing and renting nothing could be found better and the financial returns are amply sufficient to justify construction *at the present time*. It is almost certain that the excess cost will be taken out of the investment before there are any material decreases in rent. They are placed on the market at an approximate value of $35,000. At this figure the cost is small enough for one man to handle. The actual construction cost is given as $32,500, and the usual price for a desirable lot approximates $2,500.

An investigation on one of the apartments shows approximately 17 per cent. on the investment in cases where the entire amount is paid in cash. In most instances a loan of $21,000, or 60 per cent. of the cost, is made, and in that event the net income is about 32% on the actual investment of $14,000.

To have provided 192 individual houses for the tenants of the apartments already completed would have been most difficult. Long delays in construction of houses, shortage of materials and numerous other questions would have arisen. With an average price of $7,000 for a house and lot, the cost of 192 dwellings would have amounted to $1,344,000. Using the average of $35,000, the sixteen apartments meant an expenditure of $560,000, or less than half of the former sum.

Thus the construction of these apartments resulted in a large saving of money and man-power. The greatest benefit to the public was the rapidity of construction. The coal consumption to heat the apartment is far less than the amount needed for a dozen houses.

Some interesting facts are shown in studying the financial returns. During the early fall the rent ranged from $52.50 to $57.50 per month, an average of $55 for each apartment, or total income of $660 per month. The gross annual rental of one such apartment house amounts to $7,920. During the winter months the rent was increased to $65 per month. The smaller amount was considered in compiling the tabulation. The operating expenses for buildings of the type referred to in many cases were found to be about as follows:

Taxes	$387.00
Insurance—Fire and tornado	60.00
Heat and hot water	400.00
Lights in public halls	60.00
Water	175.00
Repairs and vacancies (estimated at 5 per cent. of the gross rents)	396.00
Janitor service	480.00
Annual operating expenses	$1,958.00

Exterior View of Apartment House

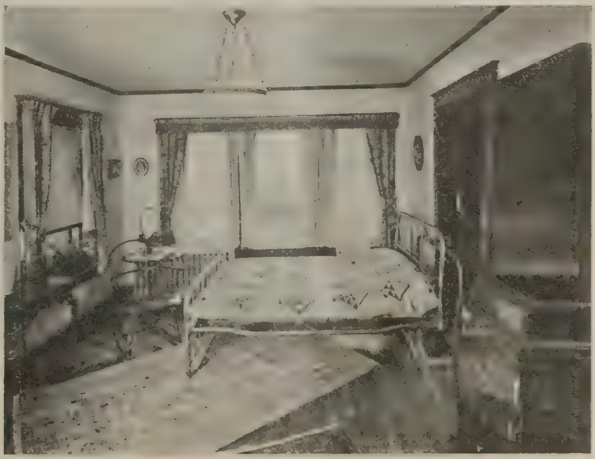
Deducting the operating expenses from the annual gross incomes leaves a net income of $5,962, or exactly 17.03 per cent. on $35,000. If a loan of $21,000 is made at 7 per cent. the interest deductions leave $4,492 for the owner, or 32.09 per cent. on $14,000, as the income from the investment.

The overall size of the building illustrated is 40 by 57 ft., and where an inside lot is used the lot should be 10 feet wider than the building. Many little circumstances enter into the construction of these apartments built during the last year so they may be offered at the reasonable price stated. Simplicity in architecture is an important factor.

The building is divided through the center with a corridor. The entrances are at either end of the building and are enclosed. Each half of the building is again divided so that each floor is quartered. The interior walls in every instance are parallel and as few as possible, while the exterior walls are without breaks—the most economical construction.

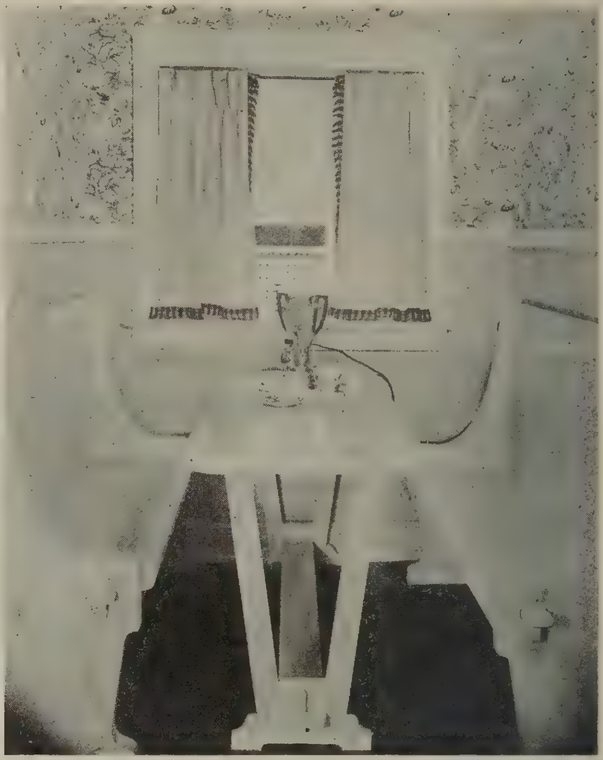
Dressing Room

Typical Living Room



Living Room, Showing Bed Ready for Use

Kitchen Service in Breakfast Room



Dining Alcove

Typical Bath Room

Each suite is of two rooms. One room by day is a living room, while a Murphy-in-the-wall bed converts it into a bedroom at night. The closet into which the bed is folded has a great deal of storage space. The kitchen has a breakfast corner with a table large enough for four and an additional person in an emergency.

The living rooms are 12 ft. 6 in. by 14 ft. 8 in., amply large. They are well lighted and ventilated and used as a bedroom are far superior to many. There are two exterior exposures for each living room.

The dressing closet has adequate space for a dresser or dressing table and chair. A great deal of hanging and shelf space is provided in each and there is room to move about freely while dressing.

The dining-kitchen is arranged to provide the maximum of space, permits direct service from the corridor and excludes the tradesmen from entering the suite. The stove, ice box, sink and cabinet are placed to allow the greatest space.

Such houses should be springing up by the hundreds in all our large cities. Mr. Builder, Mr. Architect, show this to your prospective clients. Get the order to start the plans *at once.*

Lumber Market Review

Good Business and More Stable Market Looked for by Early Spring—Buying Now Is Light

THROUGHOUT December the lumber market continued its gradual decline and even at the close of the month the market was very unsteady, although it is hardly probable that any further marked reductions may be expected, due to the fact, largely, that most of the low grade lumber is wholesaling today at less than cost of production.

An interesting feature of the market in the Middle West is the tendency of certain wholesalers to "bear" the market and at the same time to quietly proceed to buy all the bargains they can get. The purpose of this move is obvious. They look for a more stable market within the next few weeks, followed by an upward trend, for, as everyone knows, the market never stands still. Another encouraging feature is the attitude of large interests. Several very large construction projects, including wharves, docks and terminals, have been undertaken during the past month and other and even larger ones are planned to begin shortly after the first of the year.

City retail yards, for the most part, are fairly well stocked with lumber, but the country and rural dealers have great gaps in their stocks. The mills are fairly well loaded with lumber, but with sixty days of active buying these stocks would vanish.

All of the foregoing applies largely to soft woods used mostly in construction work. The hardwood situation is different. Hardwood prices, at the outset, went entirely too high when the climb began a year ago. The fall, therefore, will probably be in proportion, and the bottom of the hardwood market has not yet been reached. This applies to flooring as well as lumber for general use. Hardwood mills, on the other hand, have not such a large surplus stock and when this stock is exhausted it will take from six months to a year to replenish, due to the length of time necessary for drying.

Every one in the building trade will be interested in the existing condition of the lumber market with respect to quotations as compared with the conditions existing at the beginning of 1920. Based on wholesale values, flat grain yellow pine flooring has declined in price $40.00 a thousand feet since last January. Yellow pine dimension stock has decreased $18.50; long-leaf yellow pine timbers, $10.00; North Carolina pine roofers, $21.00; North Carolina pine flooring, $34.00; vertical grain Douglas fir flooring, $23.00; Douglas fir dimension stock, $12.00; plain oak flooring, $45.00, and Canadian spruce lath, $8.00. Lath is wholesaling today at just half the price in effect last January. It will be interesting to note that clear maple flooring is selling $20.00 higher now than at the beginning of 1920, and spruce lumber, white pine and cypress are also higher in price than they were twelve months ago. Hemlock is selling on exactly the same $50.00 base as it did last January.

In all of the construction woods which now show a decline the peak was reached last March, and, beginning in April, there has been a gradual decline up to the close of December, with the exception of the latter part of August, when most operators increased their prices to take care of the increased freight rates. But two weeks later they dropped back to their old prices, and some of them even went below. In other words, all of the mills absorbed the increased freight charges, while a number of them quoted prices even below those which prevailed before the advanced rates went into effect. They were forced to do this by the stubborn attitude of buyers, and, as a result, since September it has been purely a "buyers' market."

Every one is looking for a good business year, and the fact that the general depression of the past two months has begun to show signs of improvement indicates that a turn for the better has taken place. Tremendous building projects are planned for the coming year, and there is no doubt that building activity will be brisk by spring, which means, necessarily, that the demand for lumber will be as great, if not greater, than that of last spring, when the heavy buying forced prices of lumber higher than they had ever been in history. It is very doubtful, however, even if building construction reaches great proportions, if lumber prices will ever reach the peak of last spring because wage scales are being cut and the general cost of producing lumber is decreasing even now. It is generally conceded, however, that lumber prices will be considerably higher during the last nine months of 1921 than they are at this time.

Planning Your 1921 Building Program

AT a recent meeting during a discussion on the Port of New York a prominent speaker said he wished to describe New York as "The Port that just grew up, and during the war blew up." That same description could very aptly be applied to many a man's business. Preparedness is a necessity—not military preparedness alone, but sound business preparedness as well.

Every builder realizes that the biggest building boom this country has ever known is coming. We must make up for several years' cessation of construction work. But we don't know just when the boom *is* coming. Result—a lot of builders have made absolutely no preparations for it. Their business has grown up somehow and when the demand for *real* building suddenly comes upon them the chances are their business will blow up under the strain.

A good many persons who have with both keen insight and foresight looked into the matter believe that very active construction is more than a probability during 1921, and to avoid fighting for labor and materials when every one is crying for these things they are quietly moving actually to start their building operations before the majority take the tip. It may be a good deal like the gold rush of the '40's. When the rush once started it was more than a rush, and only the early ones struck it rich. The rest were like the man who got to the station after the train pulled out. They were too late.

To all builders who have not given attention to the matter of planning their work for 1921, we urge that they make a careful survey of the probable building needs in the field covered by them. No one can plan for another. We cannot plan *your* work. You must do that yourself. But we can and do most earnestly urge you to do this for your own benefit and for the benefit of those who may be dependent upon you to do their building.

Carefully investigate the probable need in your community. How many houses, how many stores, garages, etc., are likely to be required during 1921? By a little judicious questioning you can soon find out who plans to have building work done this year—"if conditions are right." Already projects that have lain dormant for months are being revived. Unless prices are again forced to unreasonably high levels, which seems most improbable, many of these projects will go forward. Today adequate labor is available, as well as practically all building materials, the latter at much reduced prices. If it is possible for the builder to get some of his clients to sign up such projects early in the year, not only can considerable money be saved, but also a great deal of delay. Wise operators are already buying those materials where reason indicates that bottom has been reached.

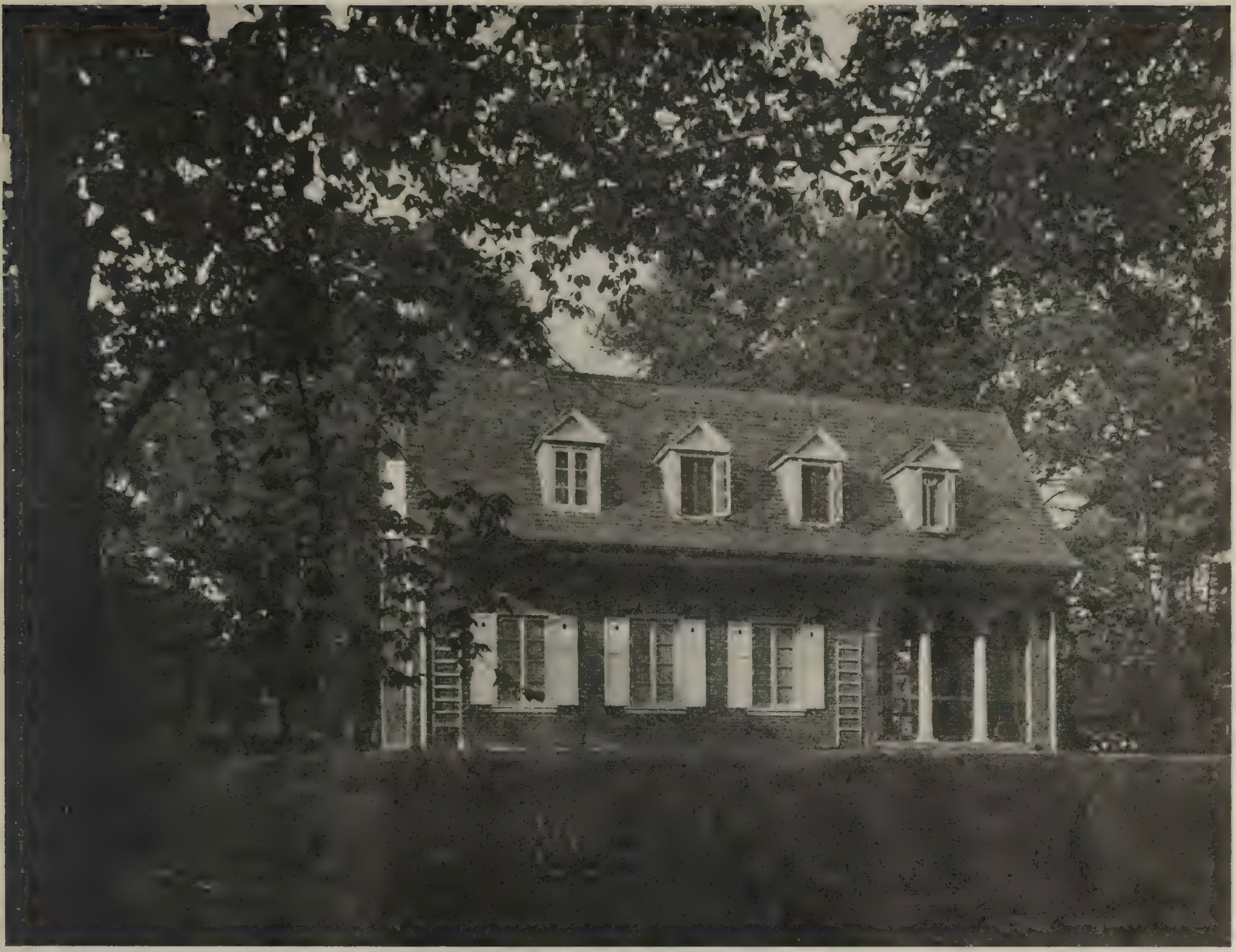
In small house building it is well to remember that really "small houses," that is, five or six room bungalows or cottages, can be built and sold very much more readily than the larger ones. This means a smaller investment and a quick turnover.

By accurately sensing the probable building program and using every endeavor to get his share, making arrangements as early in the year as possible, the builder can get started on his building program in the late winter or early spring and thus cover himself on materials, as well as getting his organization in good shape for the increased business that is bound to come later.

One of the essential things in the building business is a simple yet accurate method of keeping costs. Items should be properly charged. Rental of equipment, or interest and depreciation on the builder's own equipment should be properly apportioned. Such items as trucks, trailers, concrete and mortar mixers, derricks, hod hoists and the like used on a job must be evaluated, and the proper sum for interest on the invested capital represented by this equipment during its use on any job, plus proper depreciated charge should be listed as a definite charge rather than guessed at and lumped under "overhead." The builder's own time should be charged at a reasonable rate, compensation and other insurance, office rental, etc. One of the reasons some work fails to show the anticipated profit after completion is that such items as these are partially or wholly neglected or incorrectly charged. The operation of a proper cost system should be planned at once, if such is not already in use.

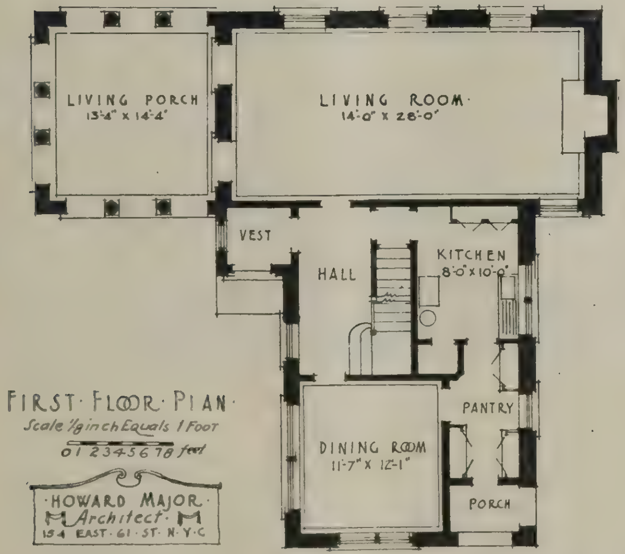
The builder should anticipate conditions, should plan for them, and when the work he has planned to meet actually develops he will be ready to take care of it. This will impart to his clients a feeling of confidence and satisfaction in his ability as a builder. Plan your own work that you may the more efficiently plan work for your clients.

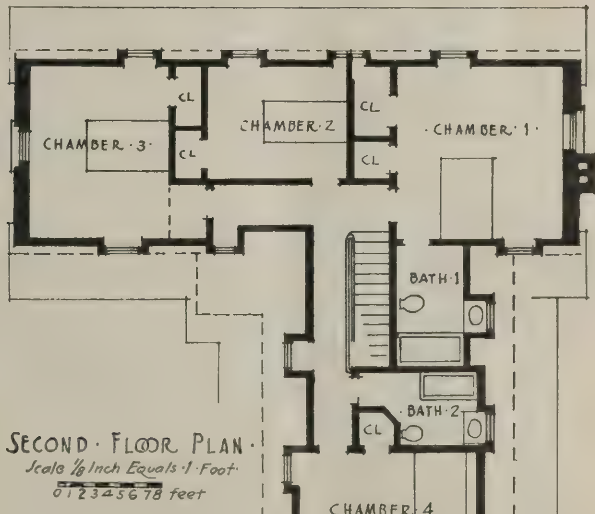
Don't be content to just build buildings, but with the building of buildings also build up a business worthy of the name.



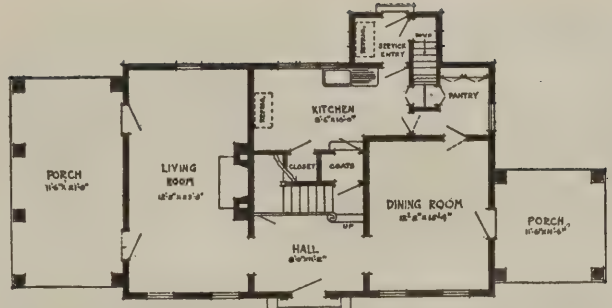
Front View

For Rear View See Page 29

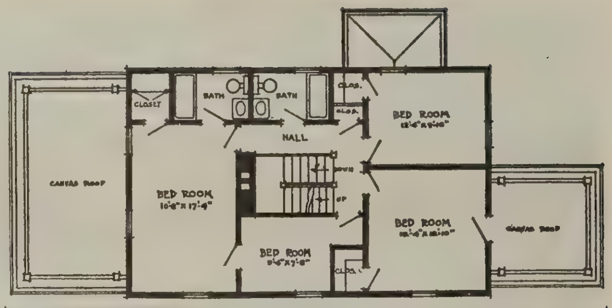




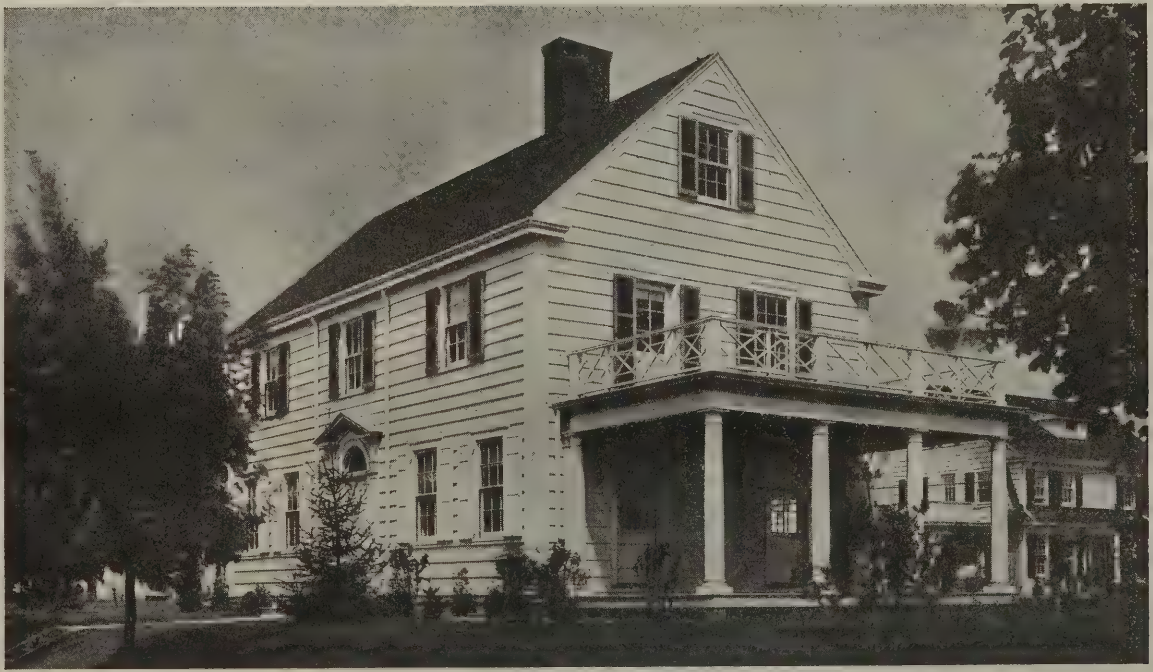
HOUSE AT SUMMIT, N. J.
Howard Major, Architect



First Floor Plan

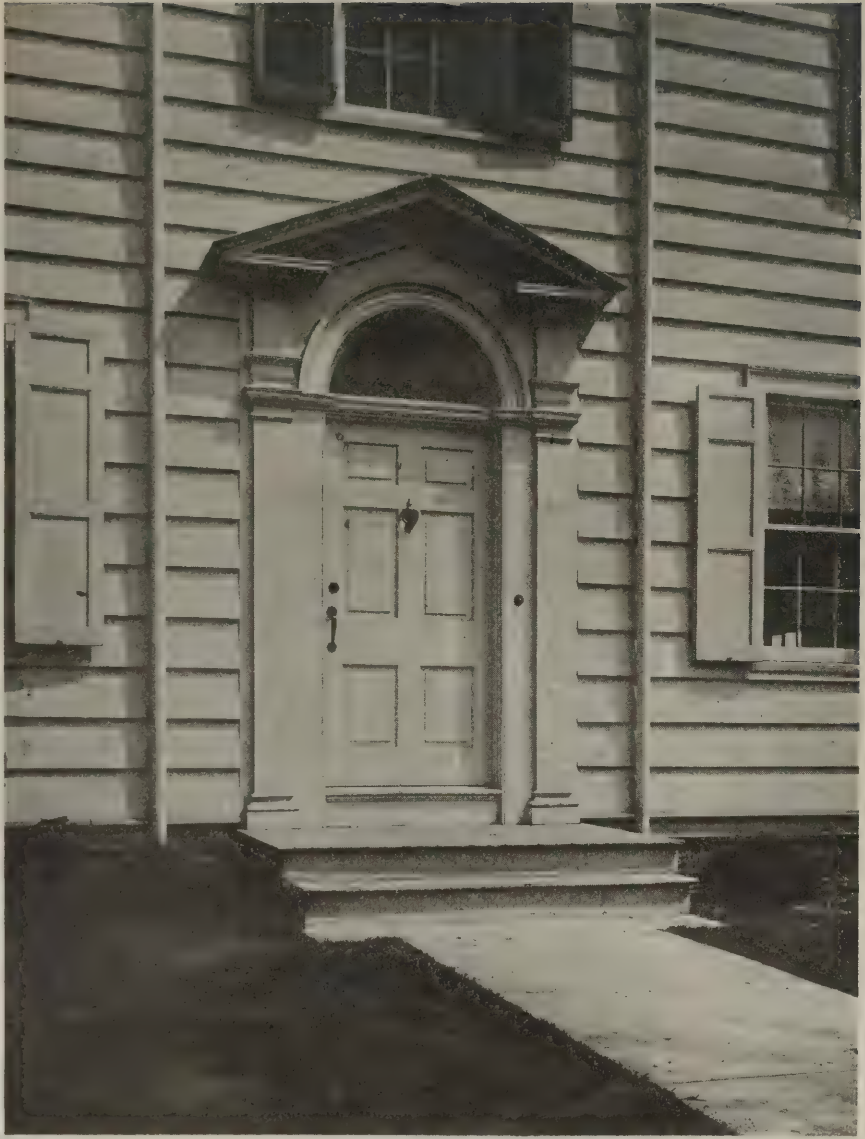


Second Floor Plan

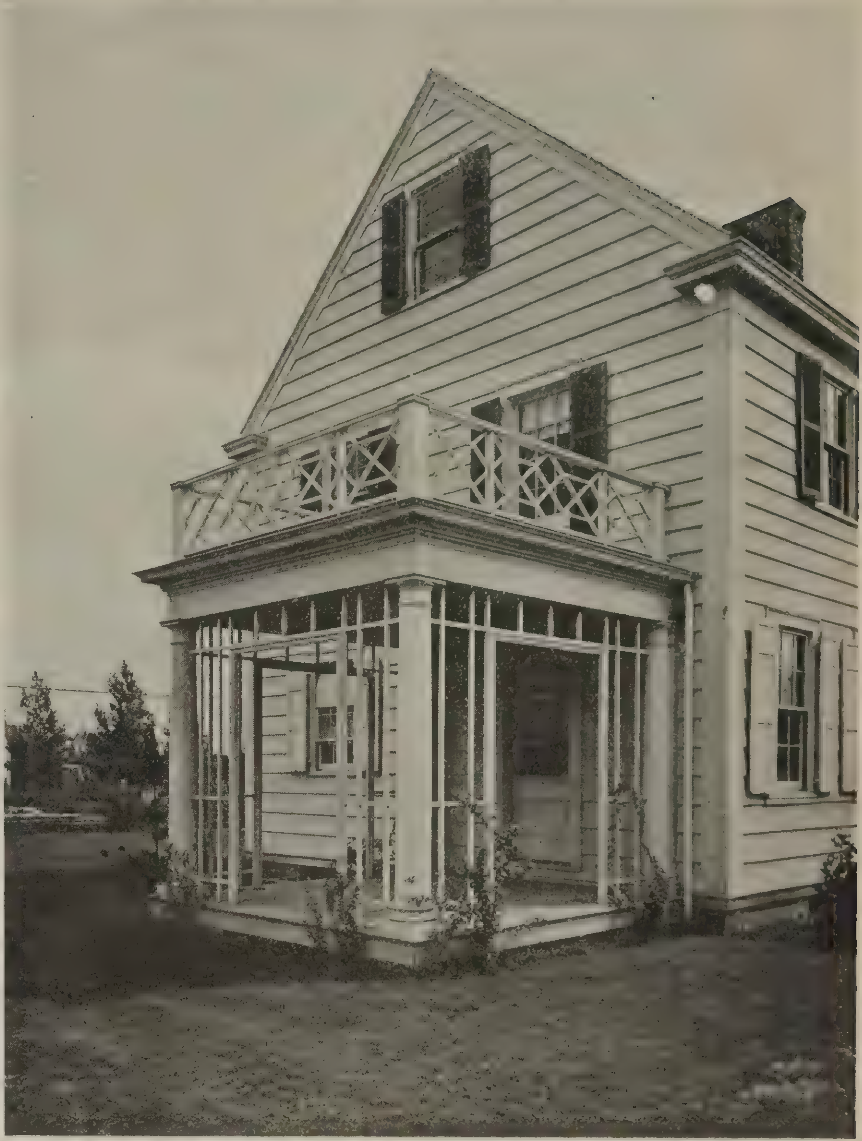


A TYPE S HOUSE (REVERSE), GARDEN CITY DEVELOPMENT, LONG ISLAND, N. Y.
Mott B. Schmidt, Architect

See Page 21 for Description of This Development

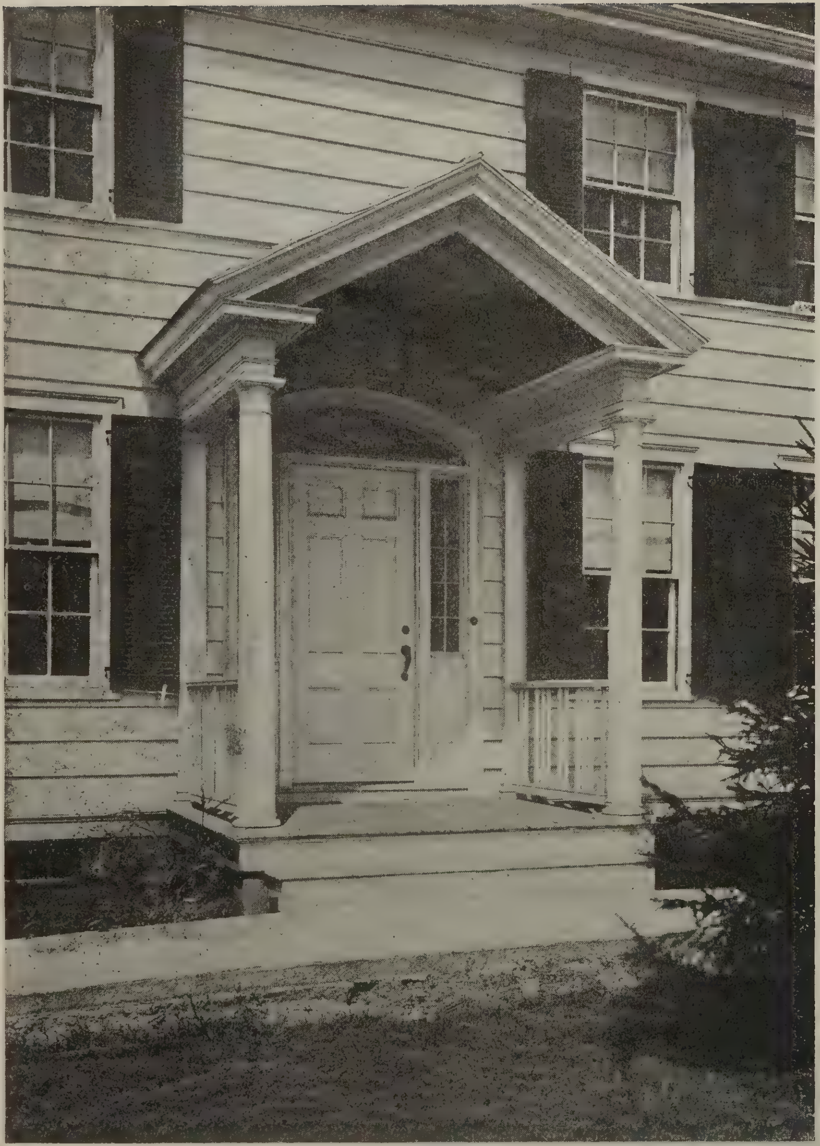


Entrance Detail

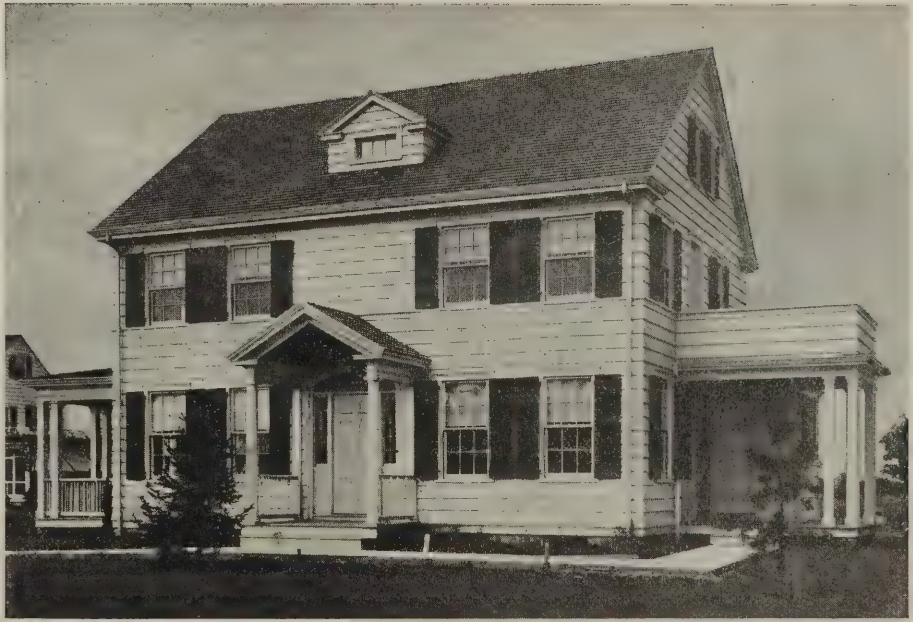


Detail of Porch

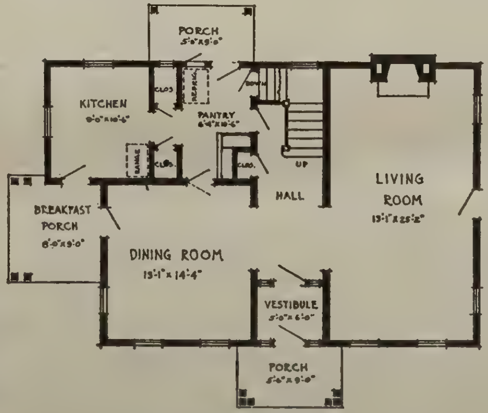
TYPE S HOUSE, GARDEN CITY, LONG ISLAND, N. Y.
Mott B. Schmidt, Architect



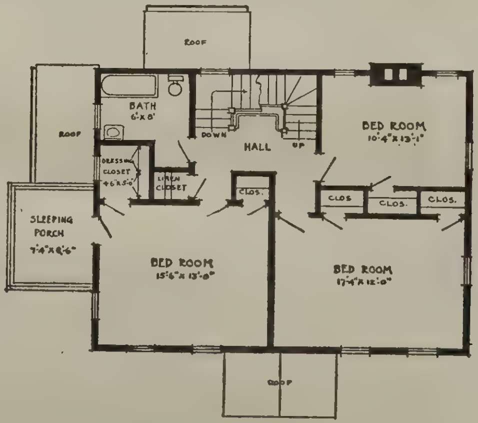
Entrance Detail



Front View



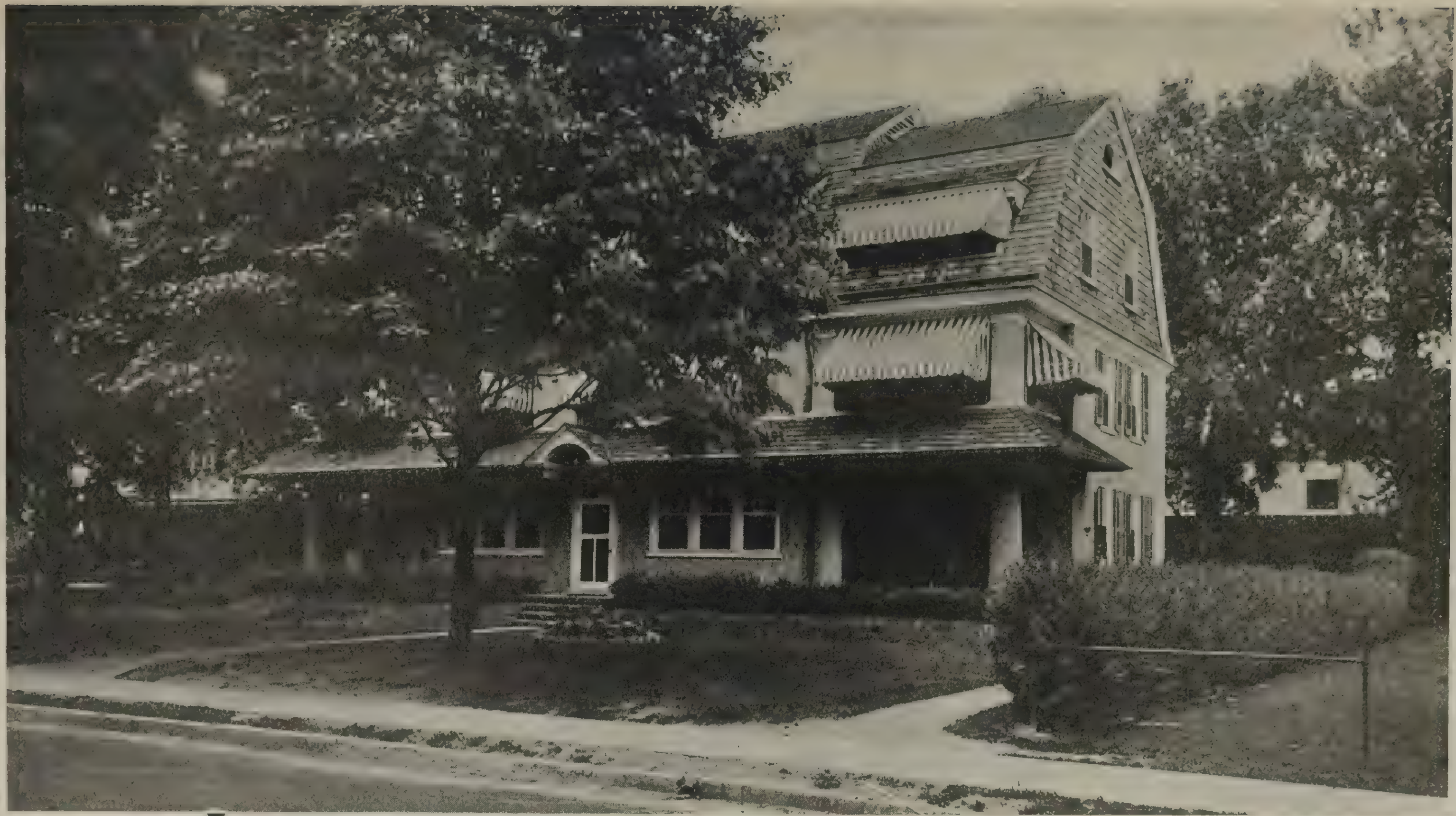
First Floor Plan

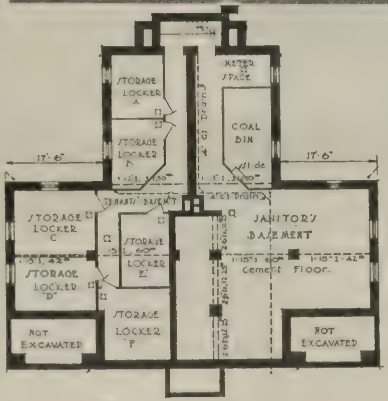


Second Floor Plan

TYPE G HOUSE, GARDEN CITY DEVELOPMENT, LONG ISLAND, N. Y.

George Gilbert, Architect



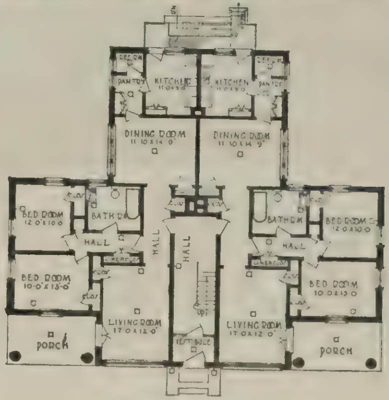


Basement Plan

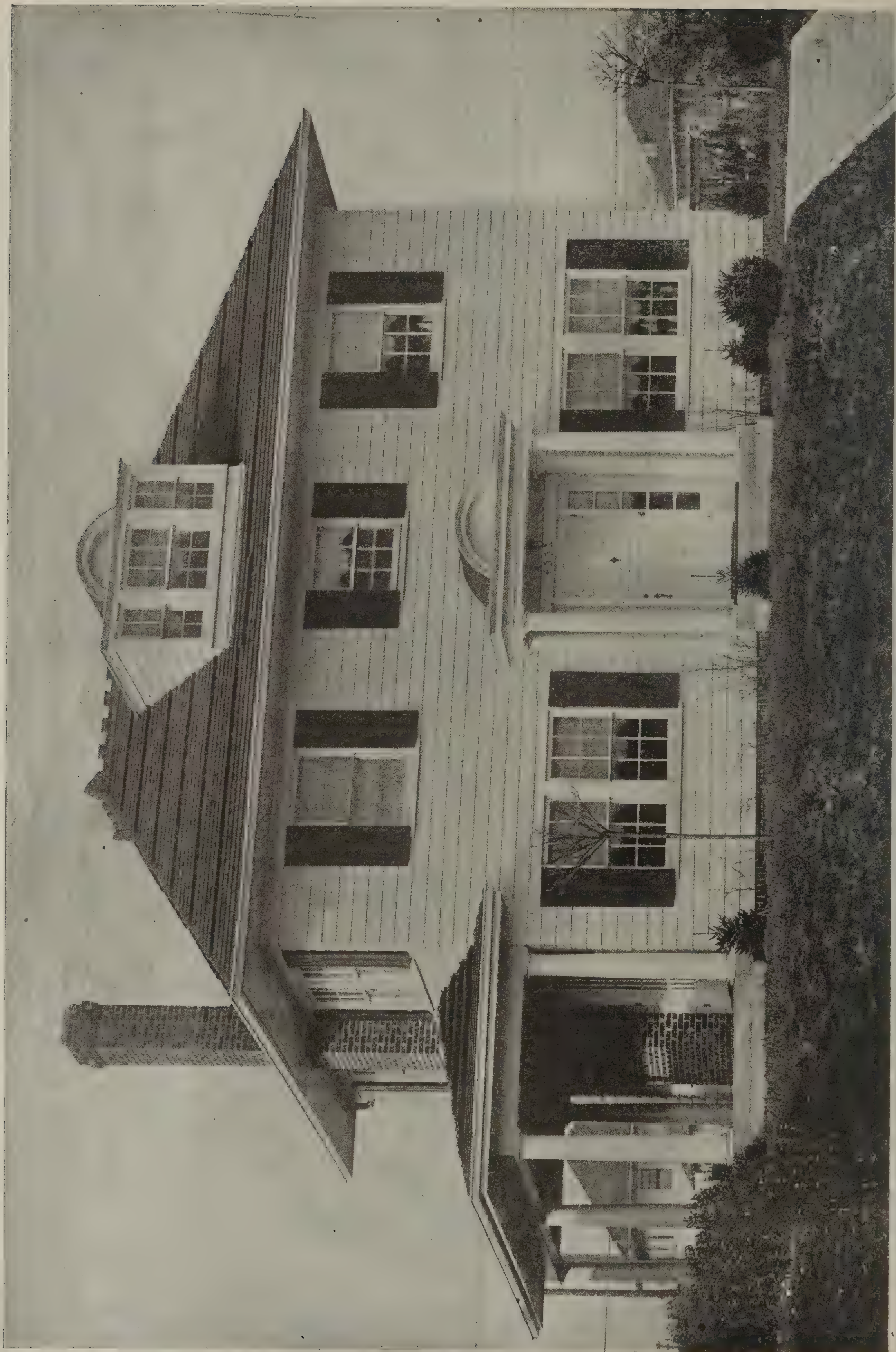
A SIX-APARTMENT HOUSE AT LANDSDOWNE, PA.

G. Edw. Brumbaugh, Architect

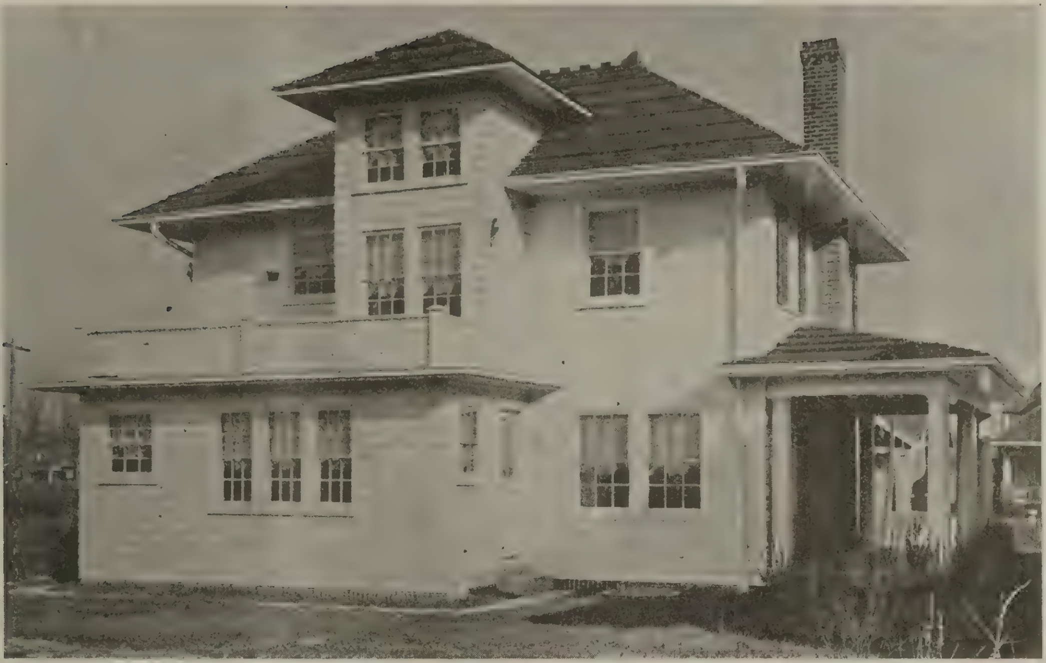
Second and Third Floor Plans Are
Similar to First Floor Plan



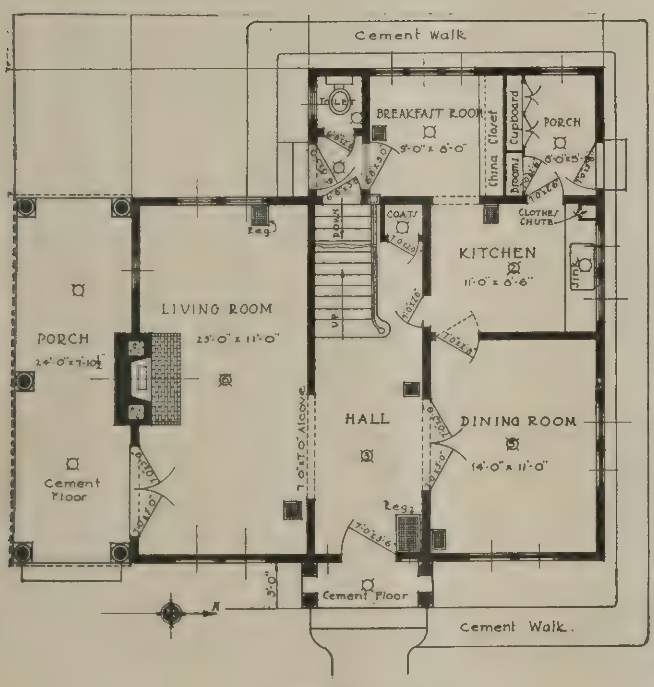
First Floor Plan



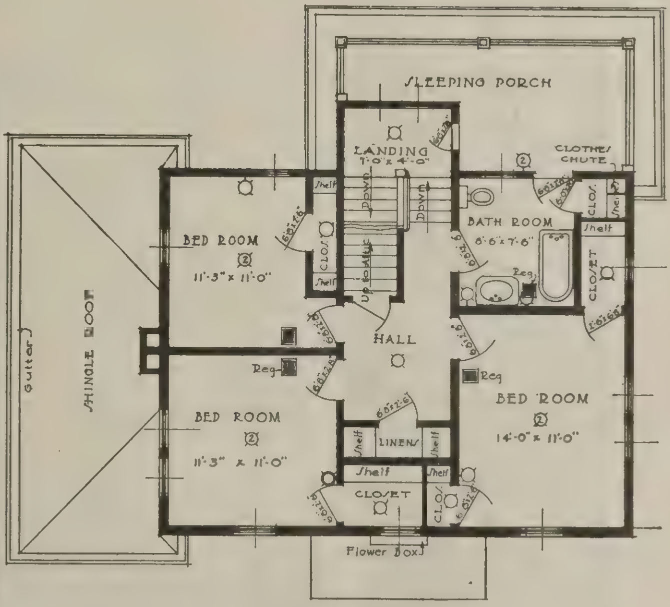
A HOUSE ON COLLEGE AVENUE, INDIANAPOLIS, IND.
Designed and Built by the McClure Building Company



Rear View



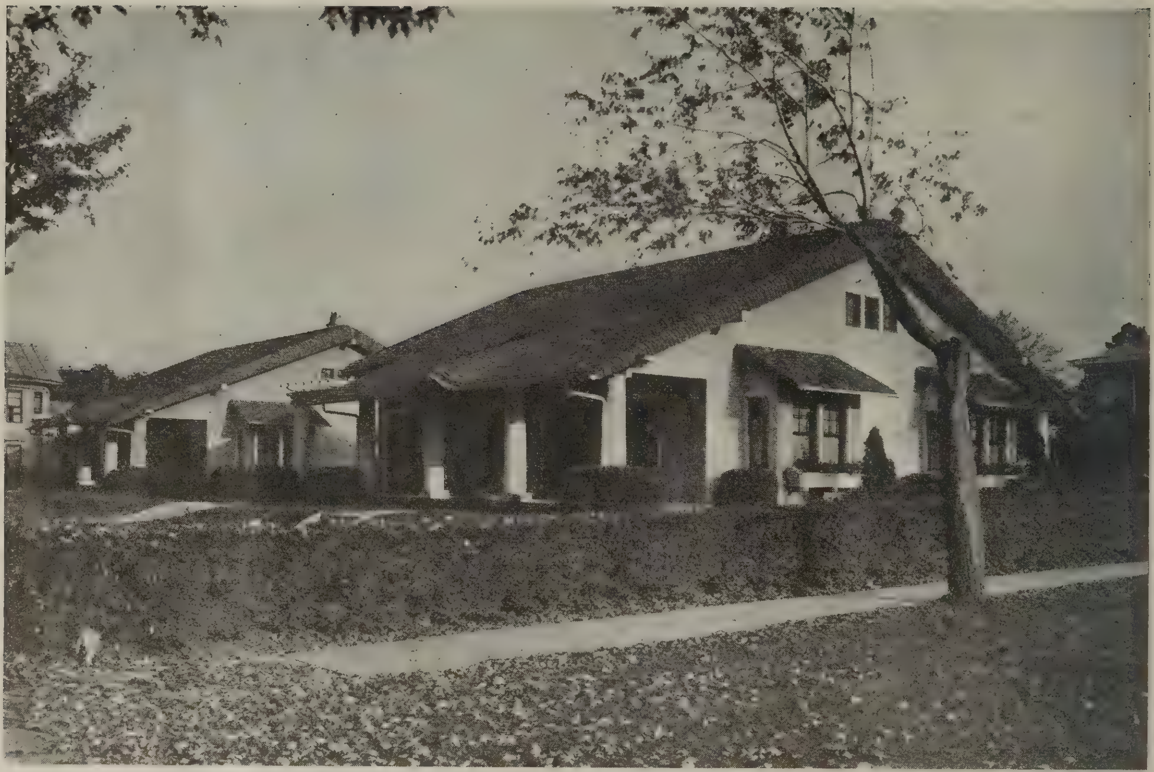
First Floor Plan

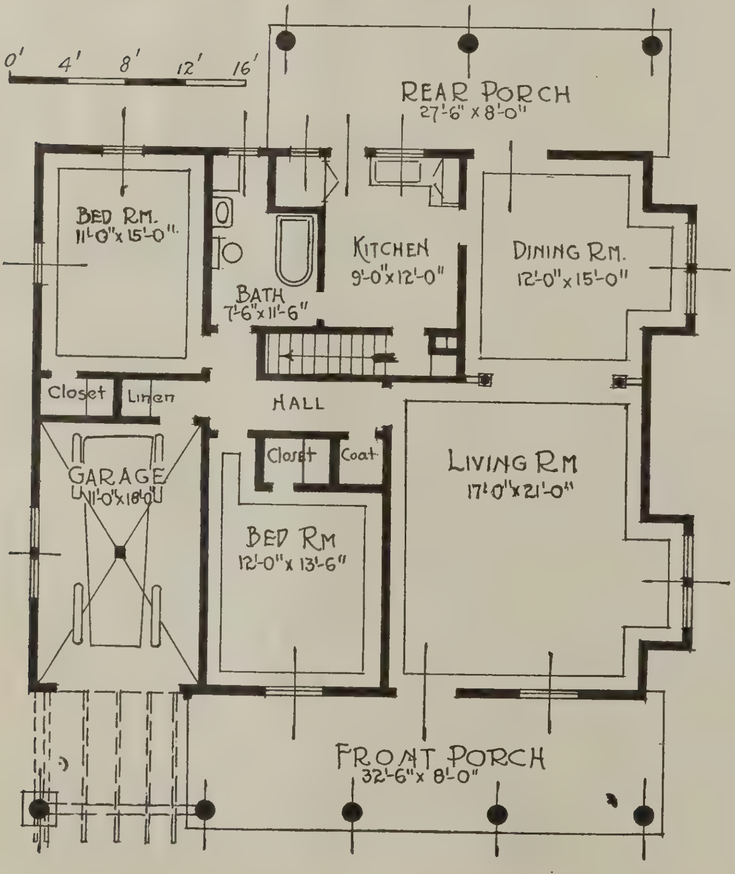


Second Floor Plan

HOUSE ON COLLEGE AVENUE, INDIANAPOLIS, IND.

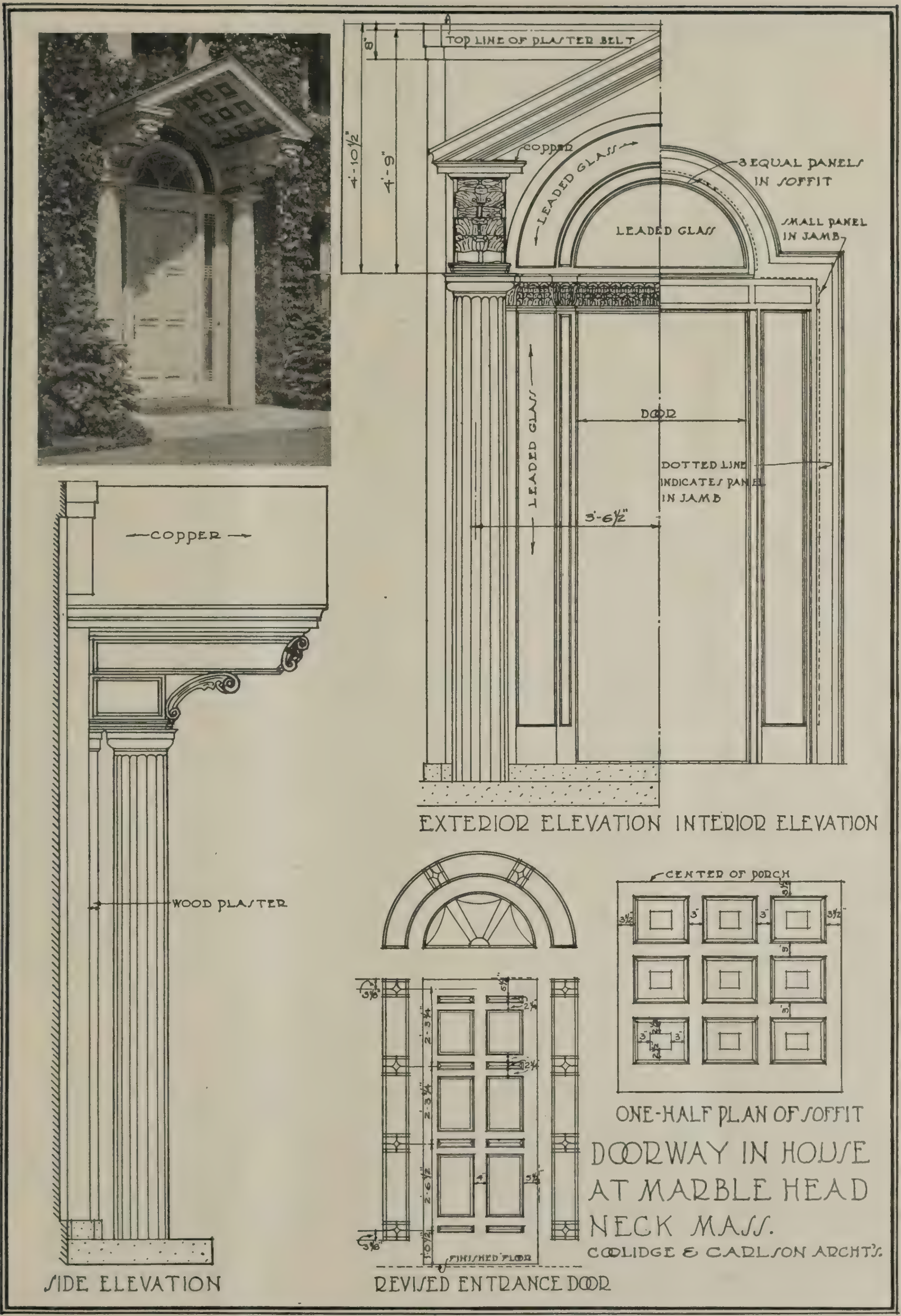
Designed and Built by the McClure Building Company





HOUSE OF E. J. ECKENRODE,
MAUMEE, OHIO

George B. Rheinfrank, Architect



AN ATTRACTIVE ENTRANCE DOORWAY

Competition for Plan and Equipment of a Model Kitchen

Extract from Report of the Jury

HERBERT FOLTZ, F.A.I.A., *Professional Advisor*

WE herewith hand you the report of the jury on the drawings submitted in the competition for the plan and equipment of a model kitchen conducted by the Hoosier Manufacturing Company, of Newcastle, Indiana, manufacturers of the Hoosier Kitchen Cabinet.

In making the awards, the decision of the jury hung upon its interpretation of certain general statements in the competition program, the more important of which are here recalled:

"The problem involves the design of a fully equipped kitchen for a family of four or five without a servant." * * *

"The jury will give consideration to the kitchen plan as an effective working unit; to the character of the several items of equipment and their relation each to the other; to the relation of the kitchen to other adjacent parts of a practical house plan; and to the skill and ingenuity displayed in the solution of the problem as a whole. The question of skilfulness in the execution of the drawings will not be considered, though neatness in their presentation is not to be disparaged."

Before proceeding to a judgment of the 343 drawings submitted, the jury formulated an opinion concerning what certain of the phrases of the program meant in terms of plan and arrangement.

"Family without a servant" implied that the kitchen must be self contained, complete, capable of fulfilling its function without a pantry. It implied a small kitchen in a comparatively small house. Nor should the operation of such a kitchen depend on the use of special equipment, unusual materials, or features which are not to be readily procured in the open market.

"Effective working unit" implied that there is a definite procedure which should be followed in the use of the kitchen—the preparation, the serving, and the clearing away of a meal. In terms of plan, arrangement and items of equipment, the jury interpreted this phrase to mean a sequence in the use of equipment in preparing a meal, as follows: Refrigerator, kitchen cabinet, range, serving table, to dining room; the sequence of use following a meal, from dining room to table or counter for soiled dishes, sink, drain board, china closet, all so arranged that work goes on from right to left, leaving the dishes after drying in or adjacent to the dining room. That is to say, clearing away should proceed from and return to the dining room in a direction opposite to the movement of the hands of a clock, or "anti-clockwise." This movement of the dishes was generally disregarded by the competitors. The phrase "effective working unit" also implied the provision of ample light from sources which would also provide a cross circulation of air.

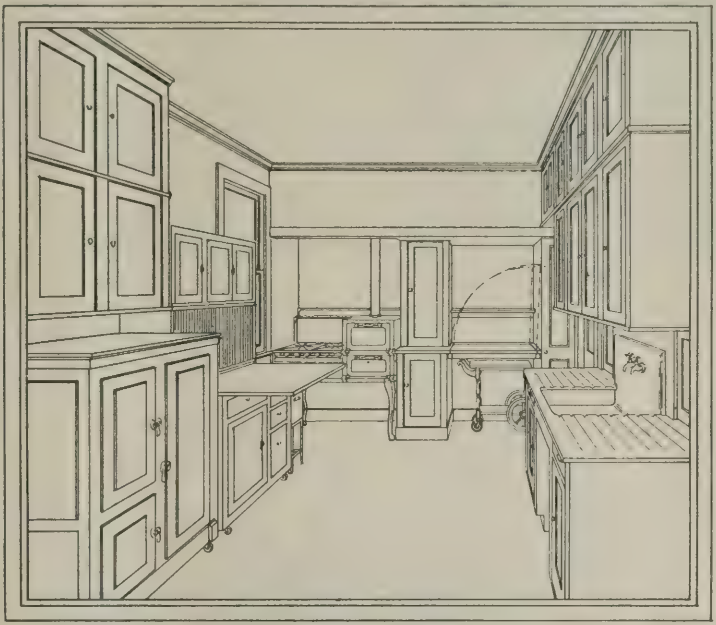
The phrase in the program "The relation of the kitchen to other adjacent parts of the house" was given a broad interpretation. To the jury this meant that the essentials of the scheme should be contained within a simple, preferably rectangular, arrangement of the walls surrounding the kitchen. Thus only could the arrangement be applied generally. As to the location of the doors connecting the kitchen with other portions of the house, the jury was satisfied on this point when a design was such as to lend itself to arrangements usually found in houses of this general category.

It was upon the foregoing summarized basis of interpretation that the work of elimination proceeded and upon which the following choice of designs was made. Because of the difficulty in reaching a decision as to the four best designs for mention out of the six last remaining drawings, suggestion was made that these six designs be mentioned, which suggestion was accepted by the Hoosier Manufacturing Company.

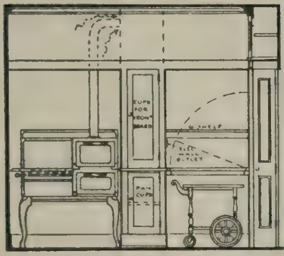
1st prize, $500. A. Thompson Thorne, Tulsa, Okla.
2d prize, $200. L. L. Perrine, Washington, D. C.
3d prize, $100. Oscar T. Lang, Minneapolis, Minn.
4th Prize, $50. Mary Drago, Gibsland, La.
Mentions regardless of rating, $25 each.
William Berg, New York City.
Louis Cowles, Santa Rosa, Cal.
Mrs. William Favrao, Springfield, Mass.
Elmer E. Nieman, Colorado Springs, Col.
Ellis J. Potter, Detroit, Mich.
E. D. Townsley, Ithaca, N. Y.

Jury {
FREDERICK L. ACKERMAN,
ALICE BRADLEY,
EDWIN H. BROWN,
IDA LANGERWISCH,
GEORGE W. MAHER.

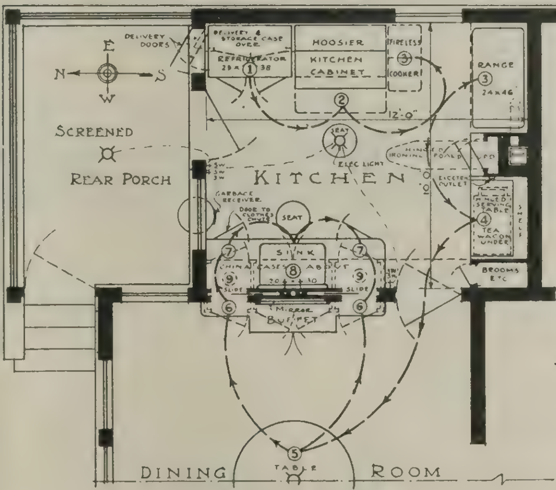
DESIGN FOR A SMALL FAMILY
MODEL KITCHEN
AS SUBMITTED IN THE
HOOSIER MANUFACTURING COMPANY'S
COMPETITION

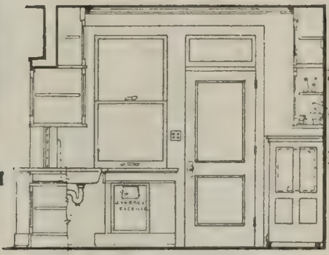


~ PERSPECTIVE VIEW ~



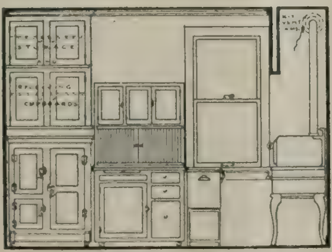
-SOUTH WALL OF KITCHEN-



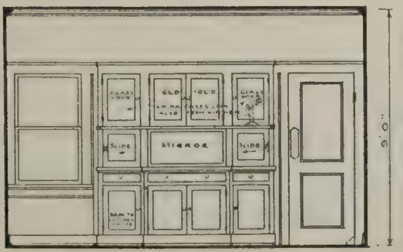


-NORTH WALL OF KITCHEN-

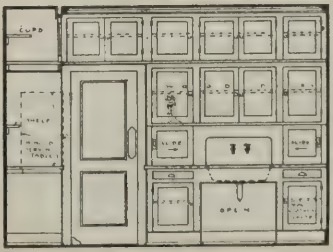
~FLOOR PLAN~



-EAST WALL OF KITCHEN-



-DINING ROOM SIDE OF CASES-



-WEST WALL OF KITCHEN-

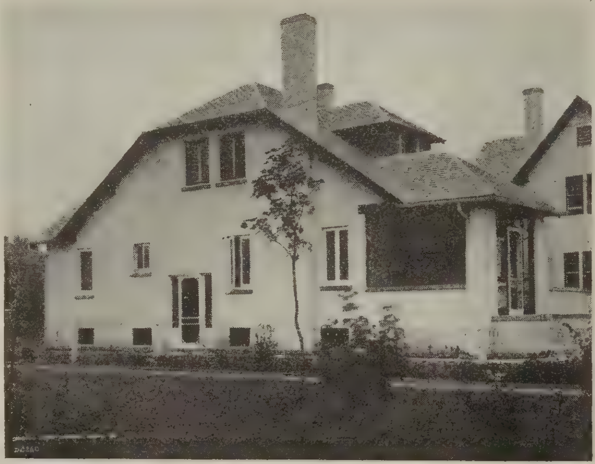
—SCALE 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 FEET—

DESIGN BY A. THOMPSON THORNE, AWARDED FIRST PRIZE

A Moderate Priced House of Tile and Stucco

THE two-story and basement residence forming the subject of this article is located at Park Ridge, Ill., and presents a pleasing appearance with its exterior treatment of stucco and dormer shingled roof. The use of leaded glass windows contributes much to these effects, while the floor plan provides a compact arrangement, with practically no waste space. All rooms are easily accessible and situated conveniently one to the other.

The front of this house has a southern exposure. The building is 40 ft. 10 in. in length (not including the front porch) and 24 ft. 8 in. in width. The clear story height in the first story is 8 ft. 6 in., and in the second, 8 ft. The front porch runs the full width of the building, but is only roofed over at the entrance. The main entrance leads directly into a comfortable living room, 11 ft. 6 in. x 15 ft. 3 in. In this living room is located a cozy fireplace, with windows on either side, and a large closet is provided in one corner, equipped with clothes hooks and shelves. At the far end of the living room a door leads to a small hall containing stairs leading both to the basement and the second floor, the latter flight being well lighted by two windows over the landing. Directly across the stair hall is an entrance to the kitchen, while beyond the stairs, on the same side, a bathroom has been provided. The linen closet is conveniently located in this hall, opposite the bathroom. At the end of the hall are entrances to two bedrooms of comfortable dimensions, occupying the two rear corners.



A House at Park Ridge, Ill.

The dining room is 11 ft. 6 in. x 14 ft. 9 in., and opens directly into the living room. It is well lighted by both the porch windows and two on the east side. The pantry, placed between dining room and kitchen, accommodates a large cupboard on one side and a refrigerator on the other. Beyond the pantry is the kitchen, also reached from the canopied entrance on the east side or from the hall, as previously mentioned. The equipment of this kitchen is commendable in the concentration of the cupboards, kitchen cabinet and recessed kitchen sink, the effectiveness of which will be appreciated by examining the illustration of the kitchen, looking from the pantry. Ample space is provided to accommodate a gas range and table without crowding, thus enabling the housewife to operate without discomfort.

The second floor is utilized wholly to house two bedrooms. The basement is equipped with vegetable and fruit rooms and a laundry in the far corner. The heating plant is placed where most desirable and convenient to a coal room.

The accompanying photographs will give the reader an excellent conception of the features of the building from the standpoints of architectural treatment, construction and finish.

The basement extends under the entire building and has a concrete floor. First a 4 in. bed of cinders was laid down, and then on top of this was applied 3½ in. of concrete, composed of one part Portland cement, three parts coarse sand, and five parts of ¾ in. crushed stone. A top coat ½ in. thick composed of one part Portland cement and two parts of clean, sharp sand and pitched to a drain completed the work. The outside steps and porches are also of concrete, given a smooth finish.

For the exterior walls and interior partitions hollow tile was used. The exterior walls are constructed of six inch blocks, having a double air-space, while the interior partitions are of 4 in. blocks with a 2 in. air space. For the foundations 6 in., vitrified tile was used. The footings are 12 in. wide and 8 in. thick.

All mortar used in setting the tile blocks was composed of one part Portland cement and three parts clean coarse sand, with lime not exceeding 2 per cent.

added to the mixture. All pipes necessary in the plumbing and vent lines were erected before the setting of the tile, but in the case of the risers for the heating system the piping was carried on the inner side of the exterior walls, and is visible on the interior of the house.

The tile was set continuously from the footings up to the basement window frames. After the setting of these frames, the wall was continued up to first floor joists, the latter being 2 x 8 in., 16 in. on centers and resting in cement pockets. At the point where the sills occur a 2 x 4 in. strip was imbedded in a cement pocket and the sills set in place. After the tile had reached its highest point, the top was covered with a 2 in. cement finish, into which double plates were pressed and allowed to set.

The roof framing is typical of middle western practice, the ridges being 1 x 8 in., and all necessary collar beams are put in. Projecting eaves have roof boards of ⅞ in. x 3¼ in. clear yellow pine, laid face down. The gable rafters are 2 x 6 in., placed 24 in. on centers, and spiked at 4 to 6 in. intervals to the wall plates. On the gable ends half the boards run in on the roof 4 ft., breaking the joints with common roof boards. The roof sheathed with yellow pine boards, and covered with shingles of white cedar exposed 4½ in. to the weather.

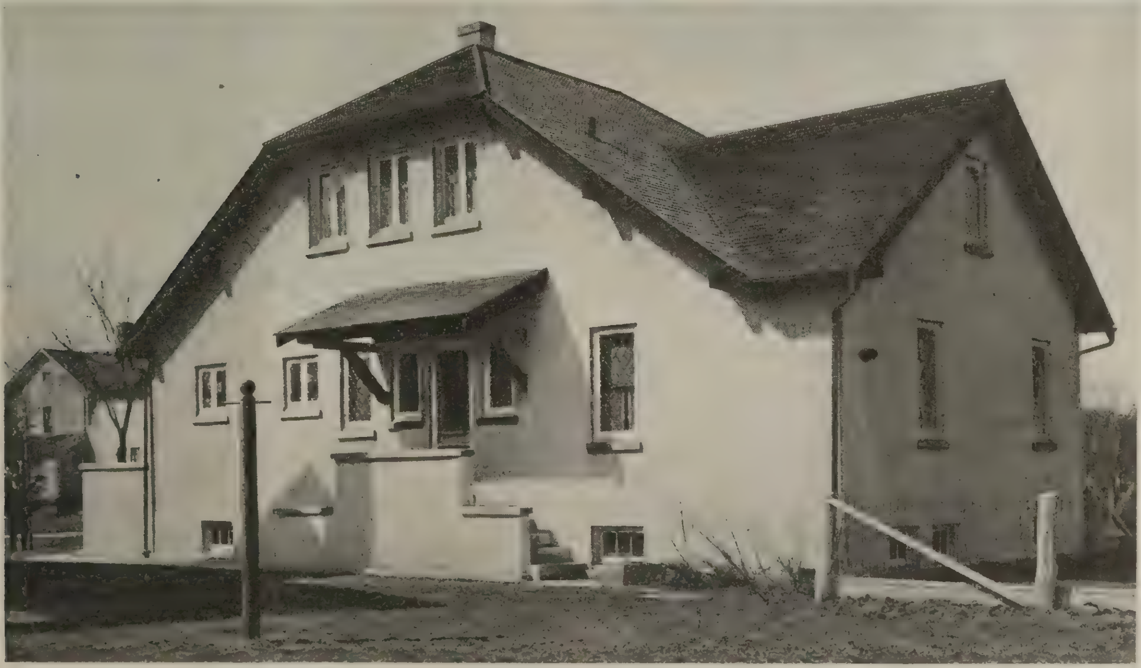
For all rough carpentry work yellow pine was used. The rooms in first and second stories have a rough flooring of 1 in. dressed yellow pine, over which, in the rooms in the first story, a layer of building paper was placed. On the second floor a deadening felt weighing one pound to the yard was laid, with all joints well lapped. Over the paper and deadening felt were laid the finished floors of first quality red oak.

View of Kitchen from Dining Room

THE INTERIOR TRIM.

The stairs to the second floor are of oak, with ⅞ in. risers and 1⅛ in. treads. The basement stairs are of yellow pine.

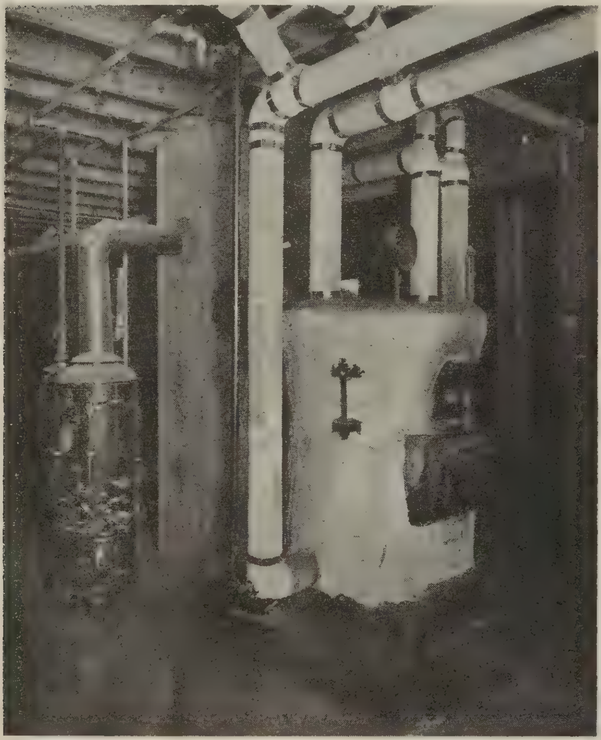
All doors are of oak, the front one being 1¾ in. thick, and those for the interior 1¼ in., excepting bedroom and bathroom doors, which are birch, with mahogany finish. All door openings have a 2 x 4 buck set in cement, to which the jamb is nailed to receive the doors.



Rear View

The pantry and kitchen cupboards, medicine cabinet and linen closet, were put in according to detail drawings. They are of yellow pine, with removable shelves.

The interior oak finish, with the exception of the floors, has one coat of wood-dye,, one coat of underlac and one coat of prepared wax. The oak floors throughout were thoroughly filled and given one coat of shellac and two coats of wax. The cupboard and case have two coats of linseed oil, painted or stained to blend with the finish of the room.



Hot Water Heating Plant and Gas Heater in a House at Park Ridge, Ill.

The exterior walls are plastered two-coat work with dash finish. The first coat was composed of equal parts cement and lime, with a proper proportion of sand, and was deeply scratched. The second coat was made up of equal parts of cement and sand, with but little lime. The final dash coat of stucco was a prepared white waterproofed compound.

All painting is three-coat work. All door hardware is dull, and door knobs are of glass.

The building is heated by hot water. Where the risers pass through the rooms they are given a coat of bronze paint so that they may harmonize with the surrounding decorations. The room is made warmer by the additional radiation from the exposed pipes, while their finish in no way detracts from the interior decorations.

Living Room

Dining Room from Living Room

The house is piped for gas and wired for electricity.

Securing a Dry Cellar

By George M. Warren

Hydraulic Engineer, Bureau of Public Roads

Part II

Damp-proofing.

WHERE the bottom or the walls of a cellar are within reach of capillary water only, dampness, not standing water, is the consequent effect. None of the methods heretofore described for drainage is of use. Capillary water may be intercepted in one of two different ways; namely, by introducing plenty of free air space or by damp-proofing the floors and walls. Figure 11 shows two methods in common use for keeping capillary water away from cellar floors. If it be desired to omit the stone insulation shown in the upper cut of figure 11 and lay the concrete directly on the ground, a richer mixture should be used and the thickness may be increased an inch. A 5-inch floor of concrete mixed 1:2:3, or even a little leaner, and put down in workmanlike manner with the top troweled to a hard glassy surface, is practically impervious to moisture and will even withstand small pressures of water.

Where it is desired to reduce or prevent dampness in existing stone, brick, or concrete walls and floors, or to shed water down the walls, the simplest method is to apply two coats of some specially prepared damp-proofing paint. As in all painting operations, the surface to be treated should be thoroughly cleaned and dry and the paint be brushed into all pores, hair cracks and inequalities, leaving a smooth continuous coating throughout. One gallon of concrete paint will double-cover from 50 to 125 square feet of masonry surface, depending on its roughness and porosity. For cellar interior work, white walls and light gray enamel on the floor give a neat, pleasing effect. Under ordinary wear and use a floor so treated does not become gritty; a broom or mop works on it without "drag," and hence the labor of cleaning or washing is much lightened.

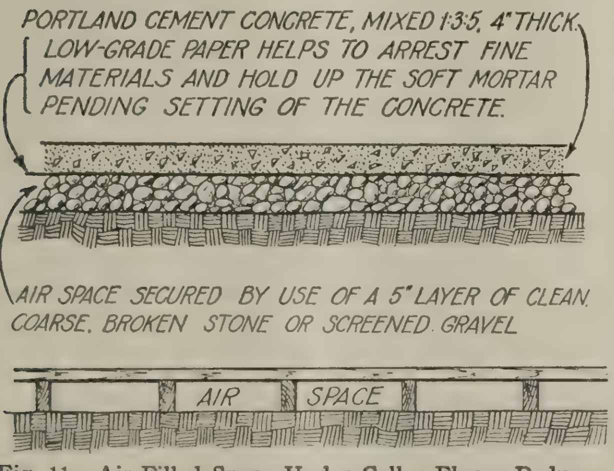

PORTLAND CEMENT CONCRETE, MIXED 1:3:5, 4" THICK.
LOW-GRADE PAPER HELPS TO ARREST FINE MATERIALS AND HOLD UP THE SOFT MORTAR PENDING SETTING OF THE CONCRETE.
AIR SPACE SECURED BY USE OF A 5" LAYER OF CLEAN, COARSE, BROKEN STONE OR SCREENED GRAVEL
AIR
SPACE

Fig. 11. Air-Filled Space Under Cellar Floors Reduces Dampness

Two methods of intercepting capillary water and reducing dampness. In both the essential principle is that of an abundance of air-filled space. The wooden floor is open to the objection that it is not permanent and offers refuge for rats and vermin.

Where a painted floor is subject to heavy or continual wear some sort of protective coating is necessary. A thick plastering of richly mixed, smooth-troweled Portland cement mortar frequently is used for this purpose. Similar treatment of the outside of walls, both above and below the ground surface, is a great aid in protecting the damp-proofing coating, and preventing flaking and peeling. Figure 12 shows the application of a heavy, penetrating bituminous damp-proofing paint to a brick wall and the subsequently applied plaster coat.

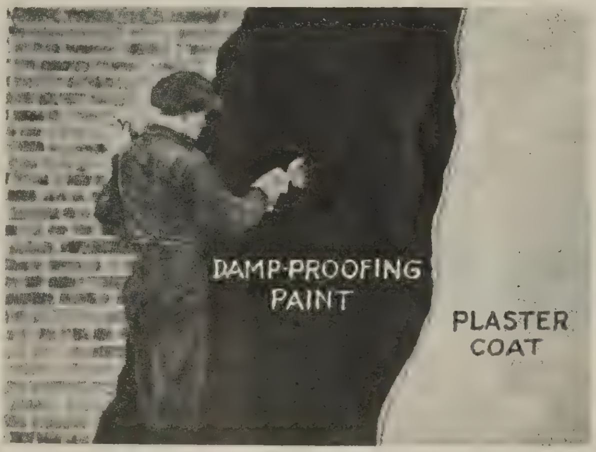


Fig. 12. Damp-Proofing Point and Plaster Coat

Application of a heavy, penetrating, tacky, bonding and damp-proofing paint to a brick wall. The plaster coat is troweled directly on the painted surface, thus protecting the paint and preventing flaking and peeling.

Figure 13 shows the use of a large brush in applying heavy-bodied bituminous or asphaltic coatings to the outside of cellar walls. A further development of the process is shown in figure 14. Here a priming and bonding coat of liquid bitumen, mixed with a strong penetrating solvent, is being applied cold with a brush, and after the primer is dry, a heavy tough bitumen compound is swabbed on hot with a roofing mop. This method is used extensively, not only to prevent the absorption of moisture, but to shed seepage down walls. For use under moderate temperature conditions a primer of creosote oil may be used, followed by a coating of coal-tar pitch applied with a mop.

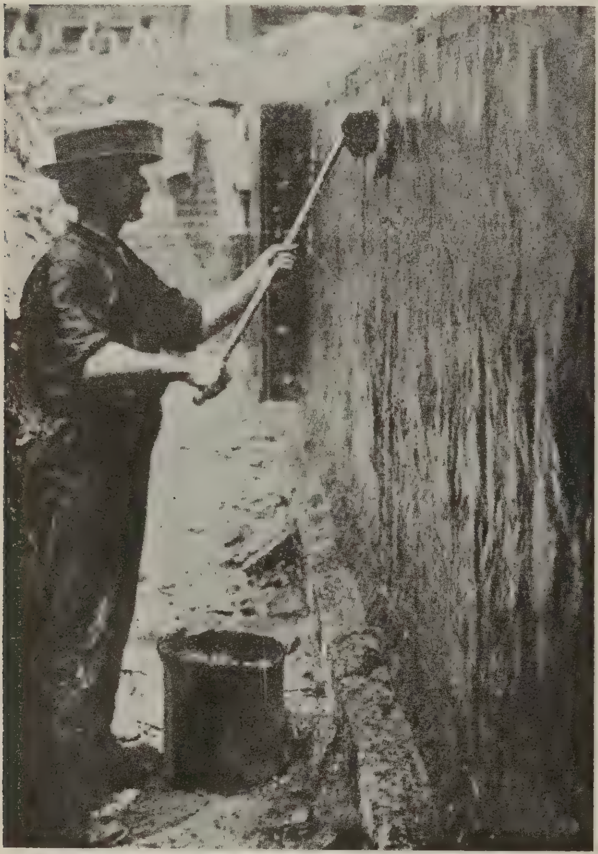


Fig. 13. Bituminous or Asphaltic Coating

Use of a large brush in applying heavy-bodied bituminous or asphaltic coatings to the outside of cellar walls. Sometimes the coating fails to take hold and later flakes off or comes off in patches. This is due to chilling and solidifying of the compound when brought in contact with a cold masonry surface. It is very important that the penetration be deep, the adhesion be complete, and a continuous, well knit coat be spread. Where the conditions are severe, two coats are advisable.

Where the use of damp-proofing paints and coatings is contemplated, one should get full directions and specifications from a reliable manufacturer whose materials are to be employed. Other methods of damp-proofing are discussed later under waterproofing.

WHERE a cellar bottom is below the water table and a drainage outlet can be obtained within reasonable distance, a drain should always be constructed for removal of the ground water at least as low as the bottom of foundation walls and the under side of floors. This is a wise precaution, even where special waterproofing measures are to be employed.

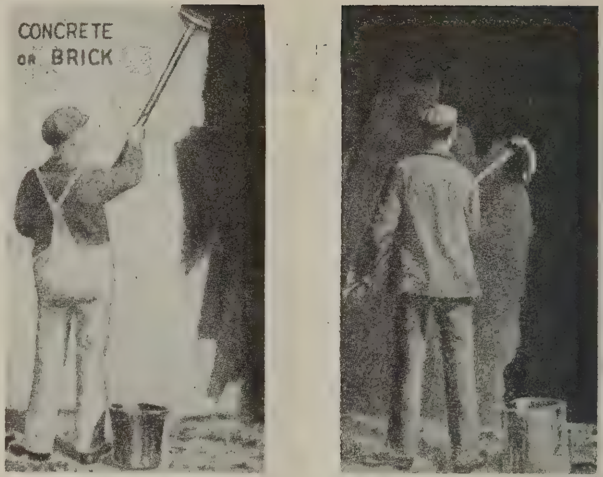


Fig. 14. Damp-Proofing the Outside of a Cellar Wall

On the left, application of a penetrating, bituminous, priming and bonding coat cold with a brush. After the primer is set and dry, a bituminous compound is melted in large kettles and is swabbed on hot with a roofing mop as shown on the right. The coating should be thick, tough, and somewhat elastic and yielding.

Figure 15 shows a 4-inch tile drain laid 6 inches below and outside of a cellar wall. The pipe should be sound, hard-burned, or vitrified drain tile or or-

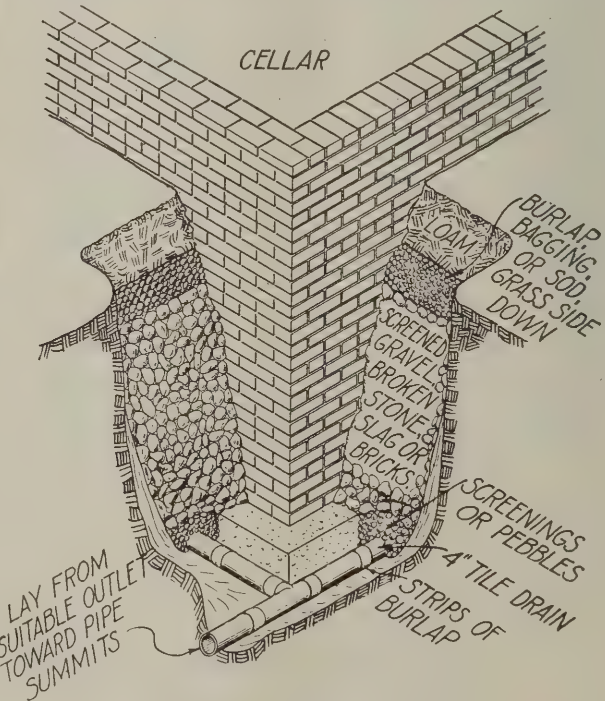

CELLAR
BURLAP BAGGING, OR SOD, GRASS SIDE DOWN
LOAM
SCREENED GRAVEL, BROKEN STONE, SLAG OR BRICKS
SCREENINGS OR PEBBLES
4" TILE DRAIN
STRIPS OF BURLAP
LAY FROM SUITABLE OUTLET TOWARD PIPE SUMMITS

Fig. 15. How to Drain a Cellar Site

Four-inch tile drain laid on straight lines and smooth grades about 10 inches outside of the foundation and 6 inches below its bottom. Refilling the trench with coarse material to the loam filling places a belt about the cellar that effectually removes ground water and intercepts both seepage and capillary water.

dinary sewer pipe with socket joints. Nothing smaller than 4-inch should be laid. The grade or fall should be smooth, and to guard against settlement of clay, silt, or mud within the pipe it should be as great as possible. If it is certain that only clear water will enter the pipe the grade may be as flat as 3 inches in 100 feet. Each pipe should be carefully bedded its full length so as to avoid uneven loading and the liability to breakage. The joints should be kept open about the thickness of a knife blade and to prevent entrance of loose earth should be encircled with strips of burlap or other similar material about 6 inches wide and 15 inches long. That the burlap may not be dislodged it should be wired or tied on with two pieces of string, one on each side of the joint. Sometimes strips of tarred paper or specially constructed earthenware gutter and cap pieces are used for protecting the joints. The pipe should be surrounded and protected with fine clean screened gravel or broken stone, after which similar but coarser material, say, one-half inch to 1-inch size, should be used to cover the top of the pipe to a depth of a foot. Over the top of the broken stone it is well to spread burlap or bagging to prevent fine material falling or washing down into the stone. Sods, grass side down, hay, straw, cornstalks, or brush may be used for this purpose with fair success. Where a building is located on a hillside and the soil against the cellar wall is likely to be saturated, the coarse stone filling should be brought up to near the surface of the ground and the top soil be placed, graded and seeded in the usual way. A belt that not only collects ground water but effectually intercepts both seepage and capillary water is thus placed around the cellar or on those sides whence the flow comes. If the site of the cellar is very soft or springy two or three parallel branch drains should be laid beneath the cellar floor.

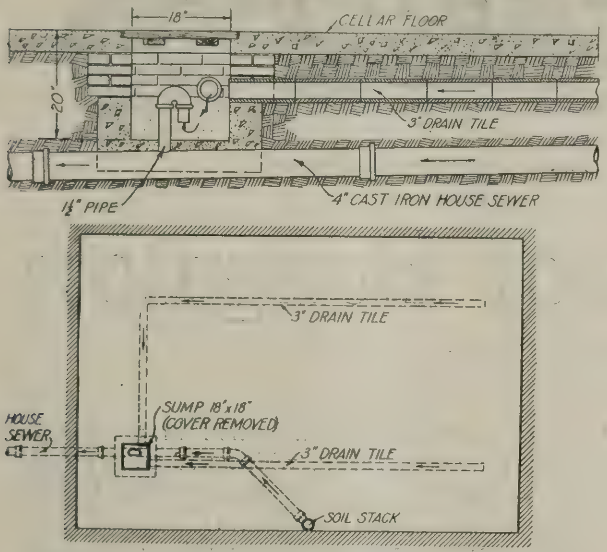


Fig. 16. Draining Through House Sewer—Rarely Advisable

Making use of an existing house sewer for lowering the ground water beneath a cellar. A hole sufficiently large to take a 1½-inch wrought iron pipe was drilled in the 4-inch cast-iron house sewer and a homemade trap and outlet consisting of a return bend and 2 short pieces of 1½-inch pipe were installed as shown in a sump 18 inches square and 20 inches deep. Ground water enters the sump through two lines of 3-inch drain tile and the open-joint brick work composing all four sides of the upper portion of the sump. Below the brick work the sump is made of concrete and is water-tight, thus securing seal against the emission of four air from the sewer. Use of a sanitary sewer for the removal of ground water is rarely advisable. Such sewers are seldom designed to handle ground water and other objections relate to the liability of sewage backing up into the cellar and leakage or evaporation destroying the water seal in the sump. If employed, the method should be considered for temporary use only, and the certainty of the water seal should be proved by frequent inspection.

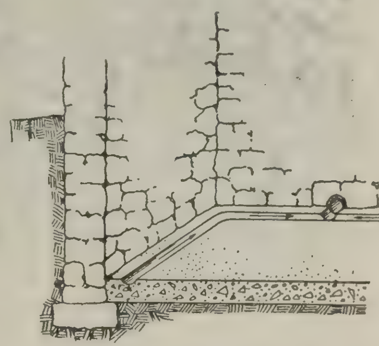


Fig. 17. Type of Drain That Should Not Be Used

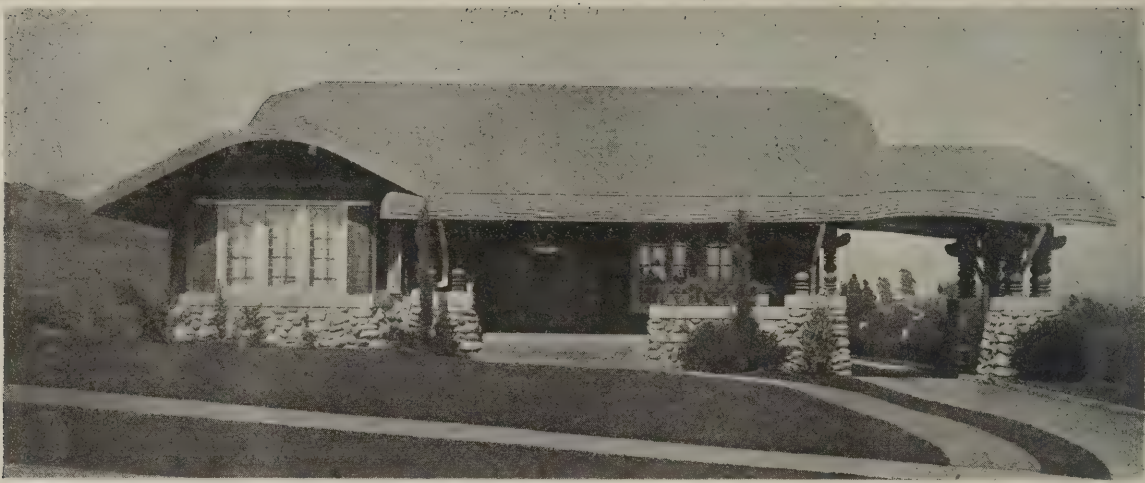
These are located just inside the cellar wall and may be half-round tile, a mere groove in the concrete, or a small stone-filled ditch draining to a low point in the cellar, and from thence through the wall to an outlet. Though drains of this kind prevent submergence of the cellar floor, they do not prevent excessive dampness in all parts of the cellar.

Figure 16 shows how a man in Maryland made use of the house sewer for lowering the ground water beneath his cellar. Usually it is not permissible to discharge ground water into a sanitary sewer, but circumstances may make it advisable.

Figure 17 shows a type of drain that should not be used. It is located about 6 inches inside the cellar wall and drainage is conducted to a low point in the cellar and thence through the wall to an outlet. Drains of this kind prevent submergence of the cellar floor, but do not prevent excessive dampness. The writer has seen in high mountainous locations and in the dry season of the year cellars having good concrete floors, but drained in the manner just described, so wet that drops of water hung from the floor beams; and hanging shelves, when punctured with a knife, exuded water freely.

WATERPROOFING.

WHERE a cellar bottom is below the water table and a drainage outlet can not be secured, waterproof construction is required. Successful waterproofing is a man's job, and calls for all the ingenuity the householder can exercise or command. A cellar may be watertight to-day and leak badly one year or ten years hence. A volume could be written on the subject, but this paper will merely discuss a few of the most important points. Methods of waterproofing will be describea in detail in the next article.



A Bungalow at Los Angeles, Cal. Arthur S. Heineman, Architect

A Thatched-Roof Bungalow

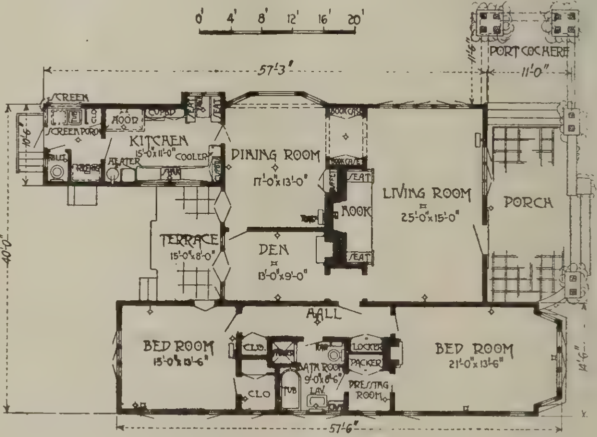
By Charles Alma Byers

EFFECTING the thatched-roof through the use of wood shingles, and in a particularly attractive manner, the bungalow illustrated herewith constitutes a charming home—pleasing in outside appearance and delightfully planned as to interior arrangement and built-in conveniences.

As outwardly viewed, the roof, it will be observed, becomes a very prominent feature. This is interesting not only as constituting a well-handled representation of the imitated thatched style but also for its graceful lines, its wide overhang, and its comparatively mild pitch. Other interesting features of the exterior are the roomy front porch, the practical *porte-cochere,* and the well secluded terrace or court in the rear.

In outside construction and color scheme, the house is further made quite distinctive. The walls are surfaced with sawed redwood shakes, stained an olive-brown shade; the trimming about the windows is done in light cream, and elsewhere is in reddish brown; the exposed masonry work consists of gray cobblestones and cement, and the roof is painted a light straw color, while both the front porch and the rear terrace or court are floored with cement.

The interior is replete with built-in conveniences and other features. Note, for instance, as indicated in the floor plan, the fireplace inglenook, with a box-seat at either side; the cased passageway between the living room and dining room, with a built-in book-case at either side; the small but practical buffet or china-cupboard combination in the dining room; the breakfast nook, with its stationary table and seats, in the kitchen, as well as the other built-in features of the kitchen; the broom closet, toilet and other features of the rear entry porch; the small dressing room of the front bed room and the roomy closet of the rear bed room, each possessing built-in cabinets; the linen closet and the special locker in the connecting hall; the dressing cabinet, medicine case and shower annex in the bath room. It also should be observed that a fireplace is a feature in each of



Floor Plan

the living room, den and front bed room, and, further, the fact that glass doors connect the dining room, den and rear bed room with the rear court.

The interior woodwork finish is comprised of Juanacosta, or Mexican mahogany, in the living room, den and dining room; old ivory in the two bed rooms, bath room and hall, and white enamel in the kitchen. Cornice moulds are used in the living room and front bed room, and the ceilings of the dining room and den are beamed, the latter in peaked style. Hardwood flooring is used in the living room, den, dining room, front bed room and hall; tile flooring, as well as a five-foot tile wainscot, is used in the bath room, and the floor in the kitchen is of pine, covered with linoleum, while the walls of the kitchen are finished to the top of the windows and doors with a smooth, hard plaster coat which is enameled like the woodwork. The walls of all other rooms are attractively papered.

The house has no basement or cellar, although the one or the other might have been provided. It is heated from gas radiators. The bungalow is located in Los Angeles, California, and was designed by Arthur S. Heineman, architect, of that city. The cost of building it today is estimated to average about $8,500, complete.

Suggestions for Correct Designing of Open Fireplaces

By Arthur Weindorf

NO home, however, humble, should be without a fireplace. An attractive fireplace has often sold a house. Without one the house will be almost as cheerless as a garden without flowers. Over and above the enjoyment to be derived from a fireplace the fire on the hearth is the eternal, the appropriate symbol of man's emergence from a tooth and claw existence.

In the home every one loves an open fire. There is something fascinating and wholesome about one that is entirely lacking in registers or radiators. This fancy, no doubt, is a heritage from prehistoric times; for man has been warmed, fed and rested before the open fire for many centuries.

The fireplace is perhaps one of the earliest forms of stove, with which all the fascination of the open fire is retained and comfort assured, and it should be constructed for the romance of the open fire, the pleasing appearance of the mantelpiece and the solid comfort and enjoyment which a well built open fireplace can give.

It does not cost any more to build a fireplace correctly than to build one wrong. It is also unnecessary to sacrifice the beauty of the chimney and mantelpiece to secure an efficient fireplace. The proper location for the construction of the fireplace is the living room. Where one chimney is planned, the living room and kitchen will both need to be adjacent to it. If additional expense be permitted, it is well to construct a smaller fireplace in the dining room.

In the majority of cases one of the owner's first requests of those who desire to build is for a large fireplace, the kind that burns whole cordwood. For the average sized home the small fireplace is much better, as a large fireplace is a powerful ventilator for the ordinary size living room; it needs a great quantity of air and will draw it through every crack of the doors and windows. This means draught. A

A Georgian Colonial Fireplace That Is An Excellent Copy of An Earlier Example fireplace about three feet in width and two and a half feet in height will be sufficient for the average home. It can be constructed along scientifically correct lines so that it will not smoke. The room will then receive from it the greatest amount of heat instead of letting a large portion escape up the chimney.

The chimney and fireplace in the average home is seldom detailed by the architect, unless it is very large and has an artistic mantelpiece. Thus the work of building the chimney and fireplace is left to the brick layer, who, in the majority of cases, so constructs it that it will not draw properly.

In order that builders in general may not be deterred because of this difficulty of constructing the fireplace and flue properly the details here presented, together with tables and rules for doing this work, may be found useful.

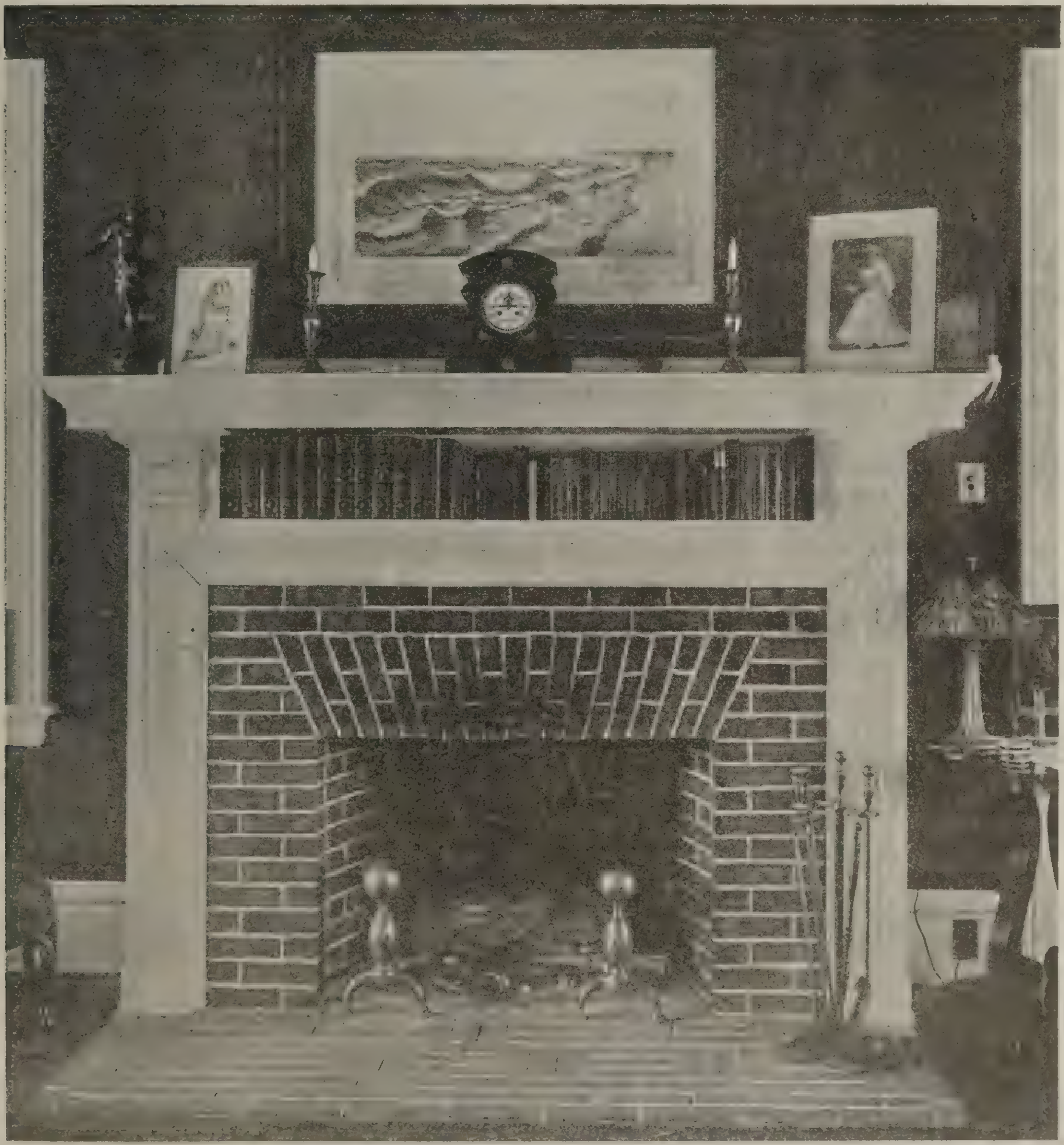
A fireplace that will be found satisfactory in every respect requires that the flue be properly proportioned to the opening, according to rules and that

A Good Example of a Brick and Tile Fireplace the smoke chamber and throat be correctly constructed.

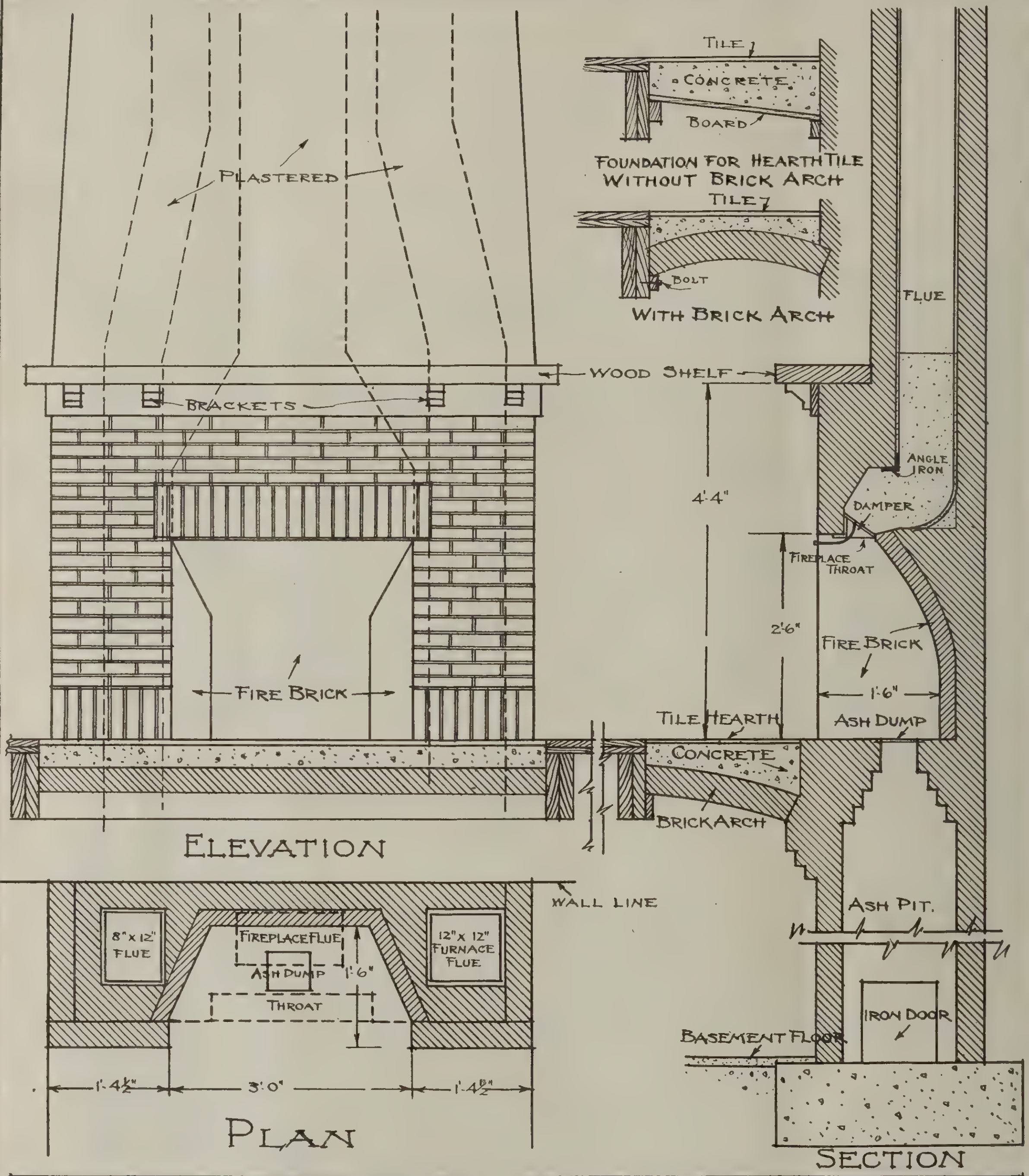
A fireplace should never be less than 16 inches in depth, and for larger fireplaces should be proportioned in size, although a greater depth than 24 inches is unnecessary. The height of a fireplace should not be greater than 2 feet 6 inches, except for unusually large fireplaces. The height, however, should never exceed the width.

The splayed sides and sloping back of the fireplace tends to project more heat into the room, giving the fireplace a pleasing appearance and also tending to produce a long narrow throat, the full width of the opening. This gives a good draft. The shelf back of throat will form a wind break which will stop down drafts. To secure a proper slope for the sides make the width of the back two-thirds of the front, letting the sides first run straight back for the width of a brick to save beveling them at the front edge, also allow the back to rise perpendicularly for about a foot before it begins to slope forward toward the throat.

A fireplace may be built without the iron damper, but its presence is a guarantee that the form and size of the throat will be right and it also helps in the construction, as its front ledge supports the flat arch brick of the front, which otherwise would require an iron angle bar. There are many approved iron dam-



A Symmetrically Designed Fireplace with a Note of Utility in the Recessed Book Shelves



FIRE PLACE OPENING	FLUES NECESSARY	WIDTH OF OPENING	DEPTH OF OPENING
24 INCHES WIDE	8 INCHES BY 8 INCHES	26 INCHES	16 INCHES
30 " "	8 " " 12 "	30 "	17 "
36 " "	8 " " 16 "	34 "	18 "
42 " "	12 " " 12 "	38 "	19 "
48 " "	12 " " 16 "	42 "	20 "
54 " "	16 " " 16 "	46 "	21 "
60 " "	16 " " 20 "	50 "	22 "

DETAILS FOR AN OPEN FIREPLACE

SCALE 1' 2' 3' 4'

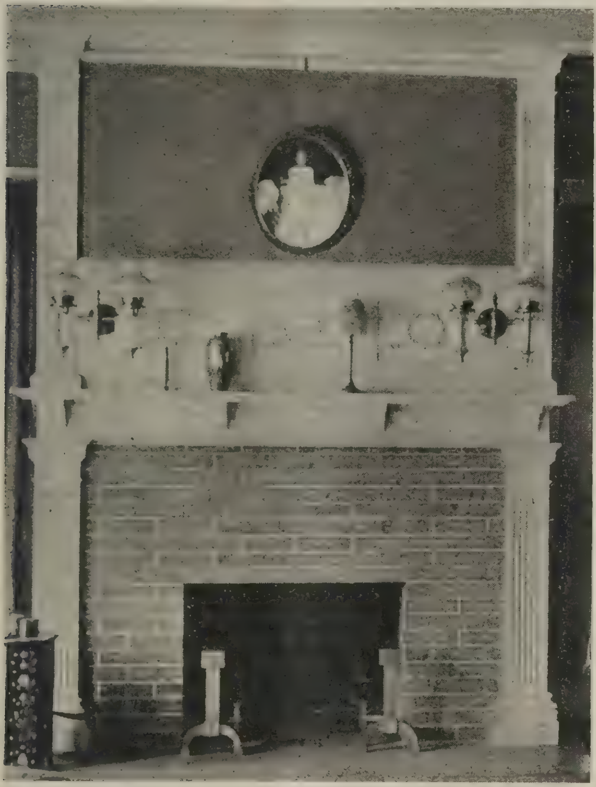
Arthur Weindorf. 19.

pers on the market to select from which will improve the draft of the fireplace.

Above the throat the brick work should be gradually drawn in from the sides to the proper size of the flue. It can be deflected either right or left, but should not be at a smaller angle than 60 degrees.

The most important feature in the proper operation of a fireplace is the size of the flue. The flue should be one-tenth the size of the fireplace and should extend two or three feet above the highest part of the roof.

A circular flue is the best shape because there are no corners to retard the velocity of the air and gases in ascending. Further, it requires less material to build a circular flue. However, circular flues are not used very much, except in large stacks. The most used flue lining is of the square and rectangular shapes. The inside of the flue should be as smooth and even as possible, as any holes or rough surface will check the draft.


A Well Balanced Wood Mantel with Applied Ornament and Brick Fire Breast

The linings should be set in cement mortar and all joints finished off smoothly inside. To prevent rain from falling in the flue and the down drafts the flue is sometimes given a bend. Flues should preferably be carried straight for satisfactory results. All flues should be lined with flue lining to give the best results for fire protection, good draft and the lasting qualities.

Chimneys and fireplaces should be built of good hard burned brick laid up in good cement mortar. Salmon brick should not be used, as they deteriorate, leaving holes in chimneys.

The walls of flues should be 4 inches in thickness if they are lined with flue lining and the flues are small. In cold climates it is well to make the walls eight inches, especially for fireplaces, as the cold air tends to chill the brick, thereby cooling the air and decreasing the swiftness of the draft.

The chimney should, if possible, be built in the center of the home, since in this location the walls are not cooled by the outside air and the house is much warmer from the surplus heat given off by the flues. In building the chimney care should be taken to have the flues large enough to get the proper proportion required. In constructing the flue for a heating plant the manufacturer should be consulted to find out the proper area of flue required.

The chimney should always be capped with a stone or reinforced concrete cap cut with the proper number of holes to fit over flues and laid up in cement mortar. This method holds together the brick work at the top of the chimney and also prevents the weather from washing out the mortar joints. The chimney should also be carried a foot or so above any nearby ridge and it should work without any cone or whirligig on top.

The brick or tile hearth should extend sixteen to twenty-four inches beyond the opening and be supported on a "trimmer arch" or "rowlock arch" as shown in details, sprung between a pair of floor joists and the chimney foundation. Wooden timbers should never run through the brick masonry under the hearth or close to the sides of the fire chamber.

Having an ash drop in the hearth is essential, as it helps to clear the hearth quickly of all ashes which are dropped into the ash pit, where they can be removed when desired.

There are also a number of types of ash drop doors and ash pit (clean out) doors on the market that will be found advantageous on a fireplace job. The frames of these doors should be properly fastened or bolted to the masonry work, as their constant use has a tendency to loosen up the doors, causing a lot of trouble.

It is not proper to put a thimble in a fireplace flue; neither is it good practice to put a cement floor in a fireplace. The floor should be of firebrick. The mantel should rest on the lower part of the chimney and not on the "trimmer arch."

The accompanying illustrations show several artistically designed fireplaces.

New Catalogs of Interest to the Trade

These catalogs may be secured direct from the manufactuer. If you prefer, write the date of this issue and the numbers of any catalogs on a postal and mail it to "Building Age," 243 West 39th Street, New York City, The catalogs will be sent you without charge or obligation.

364. **Gunite Slabs.** Cement Gun Company, Inc., Cornwells, Bucks County, Pa.—Report showing results of tests made on Gunite Slabs, together with working tables and safe load tables established through these tests.

365. **Concrete Work in Cold Weather.** Portland Cement Association, Chicago, Ill.—Booklet explaining how concrete work can be done in cold weather. This booklet contains numerous illustrations showing buildings on which the concrete work was completed during cold weather. Several methods of cold weather protection for concrete work are described and illustrated.

366. **Doorways.** Richards-Wilcox Mfg. Company, Aurora, Ill.—October issue of house organ published in the interests of the R-W line of door hardware.

367. **Power Transmission Machinery.** The A. & F. Brown Company, Elizabethport, N. J.—Comprehensive catalog No. 66, illustrating and describing the power transmission equipment manufactured by this concern. Prices are given.

368. **Buildings You Have Seen.** The Stanley Works, New Britain, Conn.—Booklet containing several large and a few small buildings that have been equipped with Stanley Works' hardware. A folder containing several testimonial letters accompanies this booklet.

369. **American Ready Wall Board.** Bird & Son, East Walpole, Mass.—Folder describing the advantages to be gained from the use of American ready wall board. Samples furnished on request.

370. **Roof Flashing Handbook—Details and Specifications.** The Barrett Company, New York City.—Book illustrating and describing the Barrett flashing blocks and flashing for brick and concrete walls. A few buildings in which Barrett flashings have been installed are reproduced. Many detail drawings are contained.

371. **Concrete in Architecture and Engineering.** Portland Cement Association, Chicago, Ill.—October-November issue contains some very interesting illustrated articles on the subject of concrete, the leading one being entitled "Building Codes Show Great Divergence in Unit Stresses for Concrete."

372. **Contractor's Atlas.** Atlas Portland Cement Company, New York City.—October issue contains some interesting data on material handling methods in connection with concrete road building, a concrete road material plant, watertight concrete, etc. Numerous photographs and drawings illustrate points brought out in the text.

373. **Solvay Paints.** The Semet-Solvay Company, Syracuse, N. Y.—Pamphlet describing these paints which can be used for stacks, bridges, corrugated iron, architectural steel, etc. The advantages derived from the use of these paints are clearly brought out.

374. **The Campbell Mortising Machine.** The Enterprise Mortising Machine Company, Columbus, Ohio.—Folder illustrating and describing this machine which, it is claimed, will make a perfect mortise ready for a lock or tenon in three minutes without the use of a brace and bit or chisel.

375. **The Dutch Boy Painter.** National Lead Company, New York City.—October number of house organ published in the interests of good painting contains some interesting data, some of the articles dealing with color in the hospital, the relation of color to architecture, water resisting power of White Lead, etc. This issue is profusely illustrated.

376. **The Pergola.** Hartmann-Sanders Company, Chicago, Ill.—Album No. 33 contains many illustrations of pergolas, latticework, arbors and other garden accessories manufactured by this company.

377. **The Concrete Builders.** Portland Cement Association, Chicago, Ill.—November-December issue contains some interesting articles on the subject of concrete for farm and home. Extensively illustrated.

378. **Absolute Bank Protection from Gunmen.** Bankers Protective Appliance Corporation, New York City.—Leaflet illustrating and describing the bullet proof safetee armor glass for teller's cage, door panes, etc. Official demonstrations of the absolute bullet proof qualities of this new formula glass have been given by the New York Police Department before executives of a large number of the leading New York banks, resulting in its installation.

379. **The Red Cross Empire Pipeless Furnace.** Co-Operative Foundry Company, Rochester, N. Y.—Illustrated booklet describing the operation and construction of the "Red Cross," which heats and ventilates as well. A few of the buildings in which these furnaces have been used are reproduced. Several testimonal letters are included.

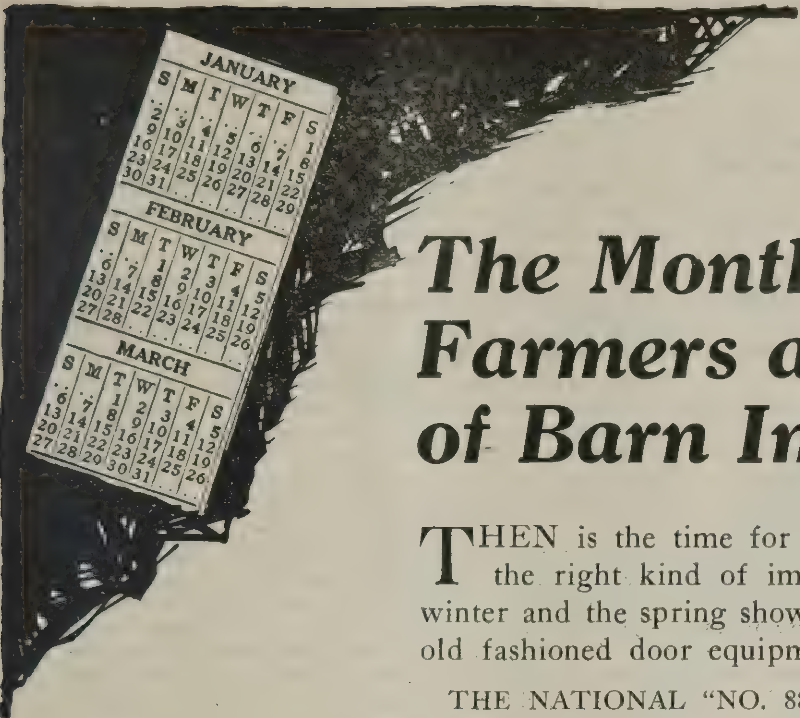
380. **"No-Sag" Screen Doors and Window Screens.** Cadillac Lumber Company, Cadillac, Mich.—Folder illustrating and describing the various styles of "No-Sag" screen doors manufactured by this company.

381. **Concrete for Beauty, Adaptability and Permanence.** Helm Brick Machine Company, Cadillac, Mich.—Catalog illustrating and describing the various models of machines for the manufacture of pressed cement brick and blocks, made by this company. Both the construction and operation of these machines are explained. Several concrete structures are reproduced.

382. **Hollow Tile for the Home.** The Hollow Building Tile Association, Chicago, Ill.—Book dwelling on the advantages possessed by hollow tile as a building material. This book is profusely illustrated, containing many detail drawings of hollow tile construction and also exterior views and floor plans of different designs of hollow tile structures.

383. **Link-Belt Silent Chain Drives for Cement Mill Equipment.** Link-Belt Company, Chicago, Ill.—Book No. 345 gives reasons why this drive is ideal for operating elevators, kilns, dryers and bag filling machines. Numerous illustrations show many drives in actual operation.

384. **Metal Roofings and Sidings.** Penn Metal Company, Boston, Mass.—Illustrated booklet describing the Penco roofing and siding products. Various types of



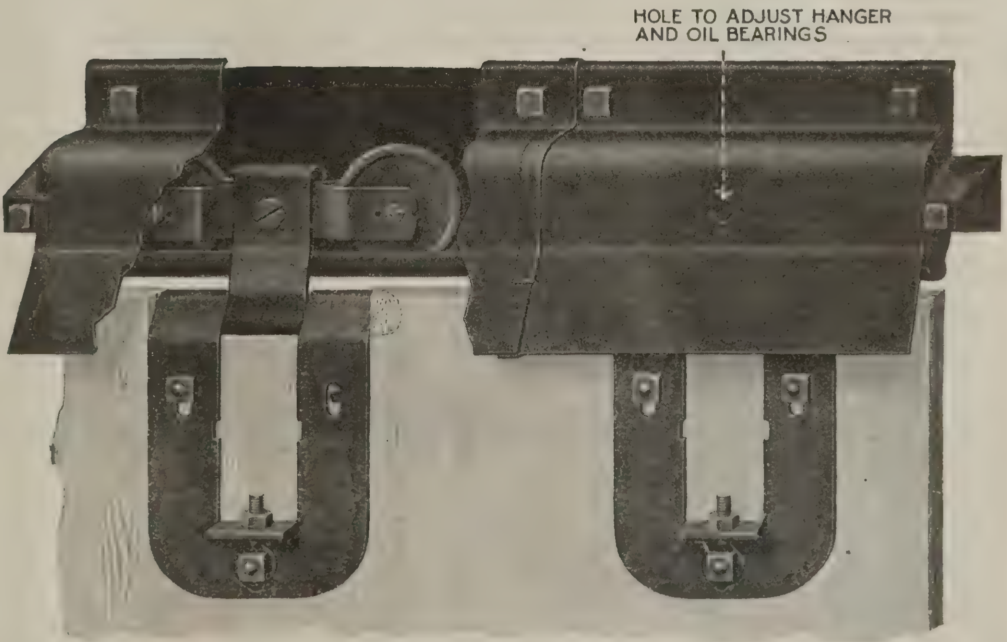
The Months when Farmers are thinking of Barn Improvements

THEN is the time for builders to get busy and suggest the right kind of improvements. The cold blasts of winter and the spring showers of the past have proven their old fashioned door equipment to be inadequate.

THE NATIONAL "NO. 88" hangers and rail with the new style end-cap and 1¼ inches of additional overhang provides against rust, corrosion and birds' nests. The Rail has an extra long overhanging cover which renders full protection to the opening above the door top, keeping out all moisture. It requires no housing and will support all the weight the hangers will carry. Made in 4, 6, 8, and 10 foot length. Hangers packed one pair in a box, with bolts for doors as well as lag-screws and end-caps for the rail and illustrated directions for attaching.

Send for our booklet, "Sliding Barn Door Equipment," showing different styles of hangers, and give dealer's name.

NATIONAL MFG. CO.
STERLING, ILLINOIS



No. 88 Adjustable

buildings on which these products can be found are reproduced.

385. **Ansonia Automatic Sewage Ejectors.** Ansonia Mfg. Company, New York City.—Booklet describing and illustrating the construction and operation of these ejectors. A partial list of installations is given.

386. **Traveling Water Screens.** Link-Belt Company, Chicago, Ill.—Illustrated book No. 352 covering the subject of effectively and economically screening condensing water. Surface condensers are easily clogged up by debris contained in the water supply, and it is possible to forestall this condition by the use of traveling screens.

387. **Truscon Standard Buildings.** Truscon Steel Company, Youngstown, Ohio.—Book showing many illustrations of standard building built with standard stock units. Descriptive text contains some interesting data on the various types of Truscon standard buildings.

388. **"Shelby" Seamless Steel Tubes and Their Making.** National Tube Company, Pittsburgh, Pa.—Book describing the manufacture of these seamless steel tubes, accompanied by illustrations showing clearly all the processes of manufacture through which these tubes must pass. A list of the materials used in manufacturing these tubes is included, as well as data concerning the tensile and physical properties of this material. The various uses to which it can be put are listed.

389. **"Terrazzolay" Sockets and Strips.** P. Galassi Corporation, Boston, Mass.—Illustrated folder describing these "Terrazzolay" sockets and strips which, it is claimed, will revolutionize the laying of terrazzo. Illustrations show method of applying these sockets and strips.

390. **Kyanize Varnishes and Enamels.** Boston Varnish Company, Boston, Mass.—Folder containing a series of twelve measured drawings representing notable and authentic Colonial types of architecture. Specifications for the use of the various Kyanize products are included.

391. **A Yard of Garages.** Richards-Wilcox Mfg. Company, Aurora, Ill.—A strip of paper, one yard long, showing actual garages all of which are equipped with Richards-Wilcox door hangers.

392. **Lock-Joint Wood Columns.** Hartmann-Sanders Company, Chicago, Ill.—Catalog No. 47 describes and illustrates the various styles of Koll's patent lock-joint wood staved and turned columns. Illustrations show various types of structures in which these columns have been employed. Prices are given.

393. **Hard Lead Products for Buildings.** Hoyt Metal Company, New York City.—Illustrated leaflet describing the various uses to which these products can be put.

394. **Details and Specifications for Counter Balanced Window Hardware.** L. P. T. Specialty Company, Chicago, Ill.—Folder containing detail drawings of this company's pulleys and chain adjusters for counter balanced windows which, it is stated, eliminate the sash weight boxes and reduce the cost of the frame, the sash weights, the ordinary pulleys and nearly half the chain. These counter balanced windows are adaptable for use in schools, hospitals, office buildings, sleeping porches, etc.

395. **Ferrokote for Iron and Steel.** The Arlington Mfg. Company, Canton, Ohio.—Illustrated folder describing Arlington Ferrokote for the protection of iron and steel. Paint specifications for Ferrokote are included. Sample show the colors in which Ferrokote is manufactured.

396. **Tools.** Goodell-Pratt Company, Greenfield, Mass.—Pamphlet showing the new tools appearing in this company's catalog No. 14, these tools being additions to the Goodell-Pratt lines of tools. Profusely illustrated. Prices given.

397. **Bench Machines.** J. D. Wallace & Company, Chicago, Ill.—Illustrated folder describing the Wallace bench planers, jointers, circular saws and band saws. Testimonal letters are reproduced.

398. **Delco-Light Power Stand.** Delco-Light Company, Dayton, Ohio.—Folder illustrating and describing this power stand which is capable of operating the washing machine, the food chopper and other household appliances. This power stand will also be found to be very useful around the barn. Its cost of operation is very low, two cents an hour being the figure given.

399. **New Precise Parallel Ruling Attachment.** New Blue Print Paper Company, New York City.—Circular describing and illustrating this parallel ruling straight edge which may be attached to any drawing board, with the complete elimination of cords or wire on the surface of the board. This new device may be of any length desired and is quickly adjustable to any required angle.

400. **Monel Metal Screen Wire Cloth.** American Wire Fabrics Company, Chicago, Ill.—Literature illustrating and describing this grade of screen wire cloth which is noted for its extreme durability, hardness and strength. It is claimed Monel will outlast by far bronze or copper, and will not deteriorate under any and all conditions. Samples and prices furnished on request.

401. **Confidential Trade Notes.** "Artisto" Products and Methods. Art Stone Company; Waynesboro, Pa.—Sheet giving synopsis of contents of the new, enlarged and improved edition of this book which treats of exterior and interior decorative concrete and allied lines. It contains, in detail, formulae, methods and definite instructions for securing various results. This book should prove profitable to any one engaged in, or contemplating entering the concrete business. Sold by subscription only.

402. **Mineral Wool for Building.** U. S. Mineral Wool Company, New York City.—Illustrated literature bringing out the advantages of lining a house with mineral wool which is both fire-proof and vermin-proof. It is claimed that mineral wool keeps the cold air out in winter, and keeps the heat out in summer. It also acts as a deadener and muffles all sounds.

403. **The "Magee" One-Pipe Furnace.** Magee Furnace Company, Inc., Boston, Mass.—Literature illustrating and describing the construction and operation of this one-pipe furnace for industrial housing, homes, farmhouses, stores, etc.

404. **Varnishes, Paints, Stains, etc.** Eugene E. Nice, Philadelphia, Pa.—Illustrated booklet describing the various paints put on the market by this company. Prices and samples furnished on request.

405. **Samson Spot Sash Cord.** Samson Cordage Works, Boston, Mass.—Catalog illustrating and describing the quality of sash cord manufactured by this firm. Samples forwarded on application.

To the Builder of Homes

DEVELOPMENTS by Architects and Builders in the planning of houses depend upon the progress of the family in the making of homes. Hinges came early in this progress. They were a development of three thousand years ago.

Today the McKinney Manufacturing Company is carrying on the development of this product so vital in the building of houses for homes.

Hinges make doors possible. The Great American Home is made up of some twenty-five million houses. Every day in these houses more than six hundred million hinges are brought into action. Millions of these bear the name McKinney.

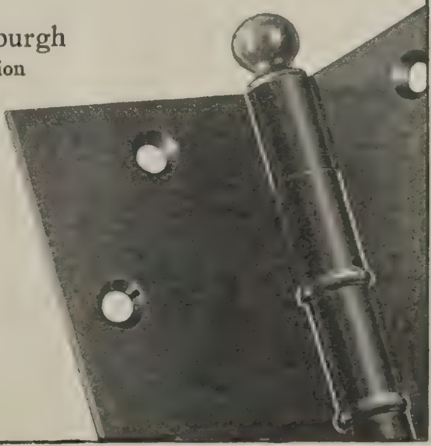
McKinney Hinges and Butts have been serving in the Great American Home for fifty years. The millions of doors they make possible respond quickly and quietly—never sagging and never squeaking. In design too, they contribute harmony for there is a hinge to blend with any architectural plan. McKinney Hinges set a standard by which all hinges may be judged.

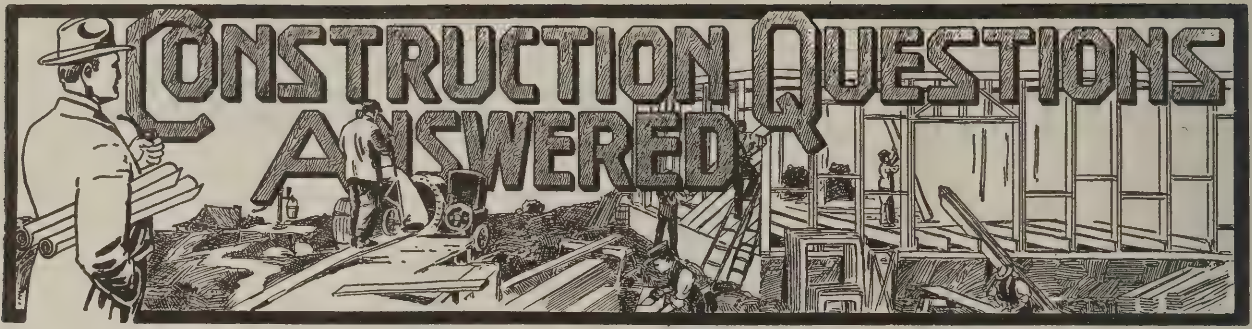
In order to aid Architects and Builders in selecting proper hinges to blend with all buildings, the McKinney Manufacturing Company is offering a booklet on hinges for the home and one on hardware for garage doors of all kinds. We will gladly send these booklets. You should also have a McKinney illustrated catalog for your office files.

McKINNEY MANUFACTURING CO., Pittsburgh
Western Office, State-Lake Bldg., Chicago. Export Representation

McKINNEY
Hinges and Butts

Also manufacturers of McKinney garage and farm building door hardware, furniture hardware and McKinney One-Man Trucks





CONSTRUCTION QUESTIONS ANSWERED

A Type of Frame Building

From O. B. M.—Thinking that readers of Building Age would be interested in a type of frame building used extensively during the late war for camp and community buildings, and which may also be used to advantage for barns, or in fact, any type of frame structure of this nature, I am presenting herewith a brief description of the same.

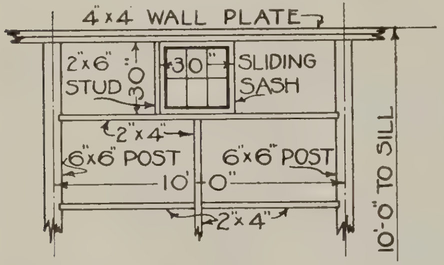


Fig. 1

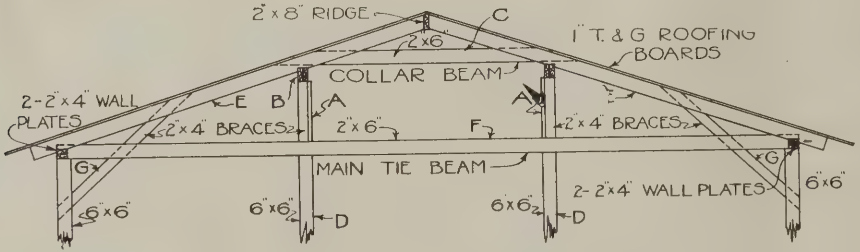


Fig. 2

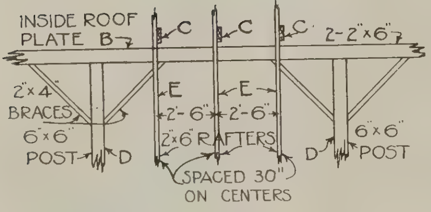


Fig. 3

The sills are 4 in. x 6 in., resting on either a foundation wall or posts driven into the ground about 10 ft. apart, leveled and shiplapped together at the joints. The sketches shown are of a building 30 ft. wide x 100 ft. long. The outside wall studding and posts were cut 9 ft. long, which gave a total height of 10 ft. to the top of the wall plates which were of 2 in. x 4 in. stock doubled. For each side wall these wall plates rest on eleven 6 x 6 in. main wall posts, 10 ft. on centers, and between these a horizontal 2 x 4 in. member is framed, placed 3 ft. below the plates. Between the plates and this horizontal member the 3 x 3 ft. sliding window sashes are set, as shown in Fig. 1. The method of the construction is indicated in the cross section marked Fig. 2. No angle or corner braces in the outer walls are used. Transverse and longitudinal bracing for the 6 x 6 in. posts was placed as shown in Figs. 2 and 3. Two rows of inside 6 x 6 in. posts support the rafters as shown.

The building was sheather and roofed with 1 x 10 T & G, N. C. pine boards. The boards were laid vertically for the side walls, the joints being covered by 1 x 2 in. vertical strips.

The flooring consisted of 1 x 4 in. boards, laid on 2 x 8 in. joints. The gables were framed with horizontal 2 x 4 in. pieces placed 3 ft. apart vertically and sheather vertically the same as the side walls. A door 2 ft. 8 in x 7 ft. was provided in each gable end.

The same scheme as here shown has been followed out in larger buildings of from 50 x 150 ft. to 100 x 300 ft. in area. Of course, the members must be of sufficient size where there are longer spans or heavier loads to carry.

Data on Flag Pole Erection

From H. F., Auburn, R. I.—I have been commissioned to raise a flag pole on the lawn of a large residence. It is desired that the pole be raised fifty feet above the ground level and to be made of wood. I know nothing about raising flag poles, and find nothing that will assist me in any of the books and magazines through which I have waded. I would, therefore, be glad to have your assistance in this matter. How deep should the pole be put into the ground? How large should it be at the butt and top? Should it be painted with asphalt to ground level, and then with three coats of white paint above? Should all fixtures and rope be put on before raising? What kinds of wood and rope are best and most durable? Is it necessary to set such a pole in a concrete foundation in firm soil?

Answer—A fifty-foot flag pole or one that extends above the level of the ground fifty feet, should be set at least eight feet in firm soil, or better yet, in a concrete foundation to prevent rotting. Treating that part of the pole which will extend below the ground

"It's The Perfect Architectural Enamel"

THAT'S what painters, decorators and architects say of Johnson's Perfectone Undercoat and Enamel after using it. Are you using the best undercoat and enamel for your work? You can't answer that question until you have tried "Johnson's".

Make the Test at Our Expense

We will send you absolutely free and postpaid a pint each of Johnson's Perfectone Undercoat and Enamel so that you can try them in your own bath room or on some of your own personal work. This will enable you to test the wonderful working qualities of these products and you can conveniently watch the work and see how splendidly it wears.

Johnson's Perfectone Undercoat is the perfect foundation for an enameled job—it is elastic, durable, non-porous, has great covering power, works freely under the brush and dries hard in from 18 to 24 hours. It will not run, sag, lap, chip, check, crack or peel. Has wonderful smoothness and opacity and will not absorb the enamel.

Johnson's Perfectone Enamel is very elastic. It will not fade, chip, check, crack or peel. It may be flowed on or brushed out. Made in Satine and High Gloss in White and standard tints.

Write us for the free packages offered above. At the same time we will send you our beautiful new color booklet "*The Proper Treatment for Floors, Woodwork and Furniture*" which is just off the press. It is full of valuable information on Wood Finishing.

S. C. JOHNSON & SON, Dept. B.A., Racine, Wis.
"The Wood Finishing Authorities"
Canadian Factory—Brantford

level with a creosote preservation is recommended. The most serviceable and decorative flag pole is one constructed in exactly the same way as is a ship's mast, that is, with a lowermast and topmast. If it is built in this way, the lowermast should be about thirty feet high, with a twenty-three foot topmast, which allows three feet for splice at the cross trees. These cross trees are constructed in the usual way, with two parallel pieces firmly bolted to each side of the lowermast on which the heel or bottom of the topmast will rest. At the upper end of the lowermast, there should be an iron collar with a loop through which the topmast runs. This lowermast should be not less than eight inches in diameter at the butt, preferably ten. In the heel of the topmast there should be inserted a sheave of hardwood. The method of erecting the lowermast will be identical with that pursued by telephone or telegraph linemen. When the hole has been prepared, the mast is lowered with its butt over the hole, and the long poles with rounded sockets on the end are taken by the workmen, and the mast lifted to place, plumbed, and the soil tamped well around the base in the hole, or concrete poured, if the latter is to be used.

Before raising the lowermast, a rope of proper size to rive through the sheave in the topmast should be fastened at the top of the lowermast, rive through the sheave of the topmast and then through a temporary block leashed to the lowermast head so that the topmast may be pulled along through the iron in the lowermast head, and settle into its place while it will be held by the fid or block.

It is well to remember that it is extremely difficult to go aloft on a flag pole to make any changes or to add anything, so that the wire spindle with the gilt ball should be fitted to the topmast before it is sent aloft, and all the necessary rigging put in place.

If the mast is one piece, of course, there will be no necessity for any topmast, and the process of raising it will be very simple.

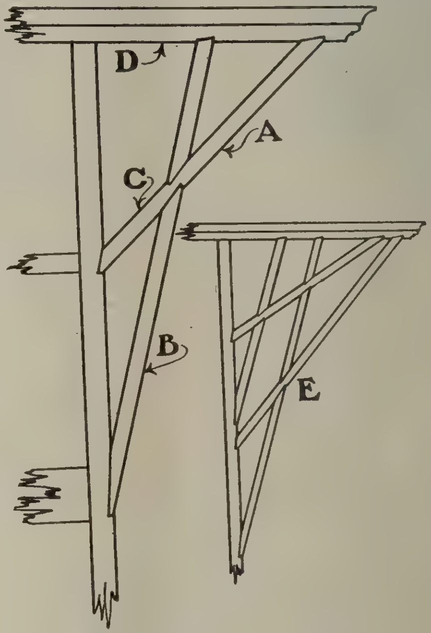
The wood used may be either good sound pine or spruce, and it is believed that it will give better service and remain more sightly if the mast is simply scraped, given two coats of oil and then varnished with a reliable spar varnish. If the mast is to be painted, the best color will be white, and the procedure will be exactly the same as for any out-of-door exposed woodwork.

Do not give the mast too much taper, or make it too thin at its upper end, for it must be borne in mind that with an ensign hoisted, or perhaps a twelve-foot drop, the leverage exerted by a flapping flag during a high wind is very considerable, and there is danger either of buckling the mast or throwing it to the ground with the liability of personal injury to someone.

The rope used for the flag should be the usual size prescribed by either the Army or Navy for signal halyards. This is a white lead rope, stands exposure to the weather and resists the friction of hard usage.

Reinforced Wood Brackets

From O. B. M.—In the accompanying sketch readers will observe methods of safely constructing very long projecting brackets giving great strength and rigidity. The brace A is halved into the piece B at C, thus preventing any deflection of D. Should the projection be long, say over 10 feet, then extra braces may be introduced as at E.



New Directory and Market Data Book.

Crain's Market Data Book and Directory of Class, Trade and Technical Papers, now on the press, promises to be of unusual interest to advertisers generally and users of trade and technical papers in particular. It not only lists all of the business publications of the United States and Canada, giving circulations, rates, type page sizes, closing dates, etc., but supplies a market analysis of each trade, profession and industry. Thus the reader is given the basic facts of each line in which he may be interested, including its buying power, buying methods, character of requirements, etc. The volume, which is bound in cloth and contains nearly 500 pages, is published by G. D. Crain, Jr., 417 S. Dearborn street, Chicago.

10.54
8.
rch

FEBRUARY 1921

Building Age

Vol. XLIII No. 2

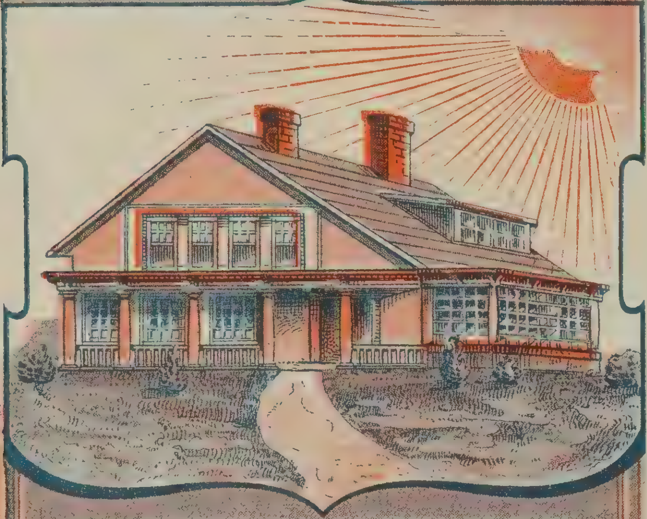
Price 25 Cents

CON-SER-TEX

IS NOT AFFECTED BY

SUN-WIND-RAIN

SNOW AND FROST



THE IDEAL ROOFING

For Porch Floors
Sun Parlors
Sleeping Balconies
All Flat Surfaces

Wherever a durable flashing or a lining for a wood box gutter is required—
Wherever an economical, durable, attractive covering is needed—
Con-ser-tex Canvas Roofing will give satisfaction. It's a chemically treated heavy cotton fabric which will not crack, stretch, shrink, curl or peel. It's easy to lay and profitable.

Our Free Booklet, "Roofing Facts and Figures" illustrates and explains the many uses and advantages of Con-ser-tex.

WM. L. BARRELL CO.
8 Thomas Street
New York City

Chicago Distributer
Geo. B. Carpenter & Co.
430-440 North Wells St.

California Distributer
Waterhouse-Wilcox Co.
San Francisco & Los Angeles

FLOORS

The Wood-Mosaic Kind

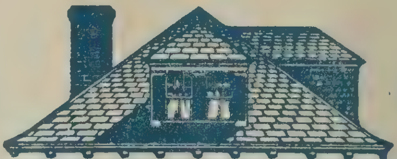
For every home—Old or New. Can be installed by your mechanics. Our 5/16″ flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood Carpet, strips Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalogue in natural wood colors.

Wood-Mosaic Company
New Albany, Indiana

Asphalt Shingles



Prepared Roofings

REX
ROOFING
PRODUCTS

Manufactured to fill every need of a roof-covering in any climate and by a manufacturing concern whose policies are shaped to be "right" from every point of view.

THE FLINTKOTE COMPANY, INC.
BOSTON, MASS.

NEW YORK, CHICAGO NEW ORLEANS

BUILDING AGE

NEW YORK, FEBRUARY, 1921

What Are Builders Thinking About Today?

AFTER the reckless riot of the past six years, the question of economy is before us again. The necessary and unnecessary waste and extravagance of War has had its fling and the cool and sober judgment of Peace is returning. With it comes the realization that extravagance and waste must give place to sound common sense and rigid economy.

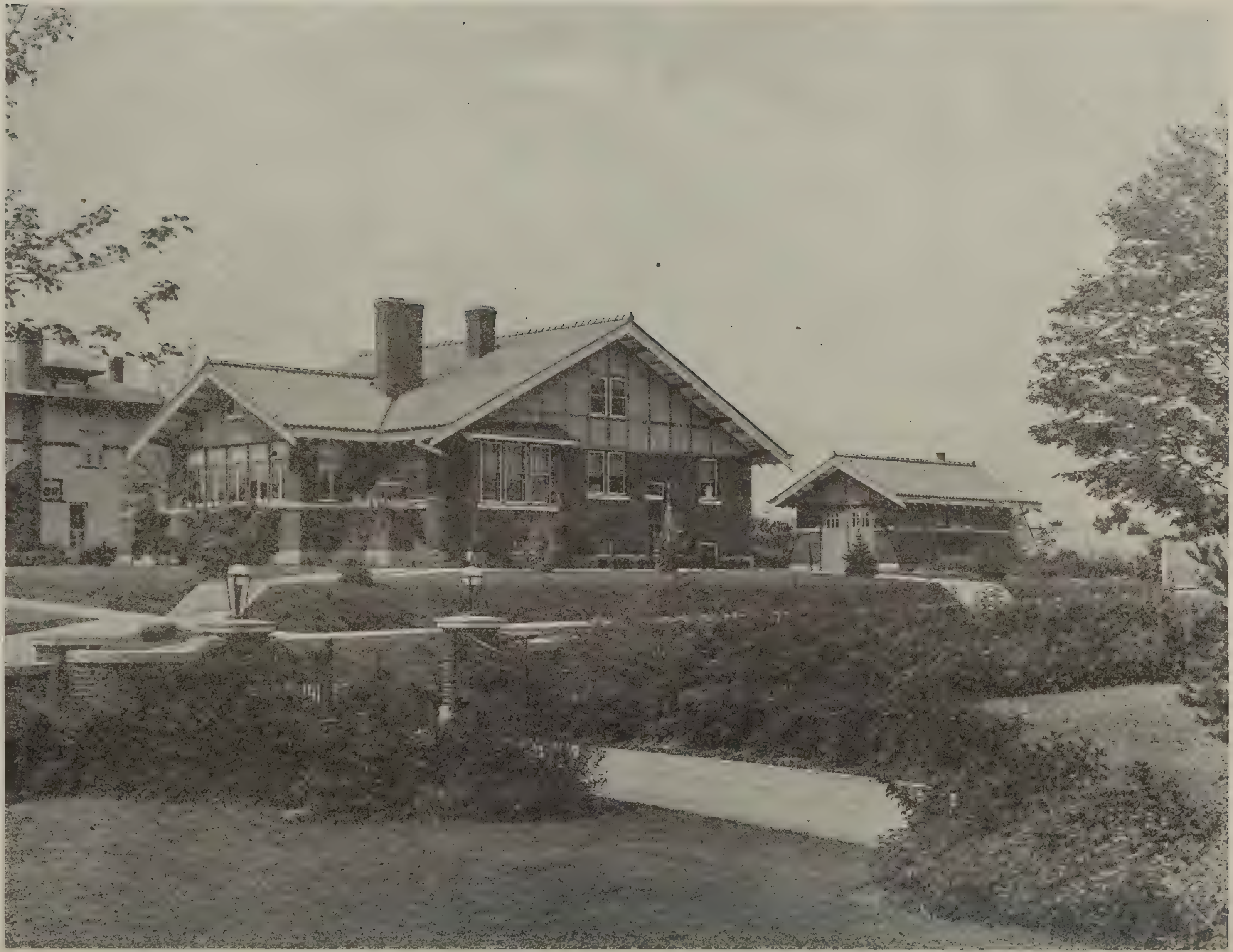
Builders throughout the country have been among the first to recognize this fact and their keen perception is reflected in the work they are turning out. This work is stamped with the mark of economy. No longer is it a question of *how much can we spend,* but *how much can we save.*

Economy is a much misused and misunderstood word. The cheapest pair of shoes is not always the most economical. Shoes that may typify economy for a salesman may be a waste of money for a policeman. In simple, everyday English, therefore, economy means *getting the most for your money—getting the best results for the money spent.* The successful architect or builder understands this, and studies the needs and requirements of the job in hand.

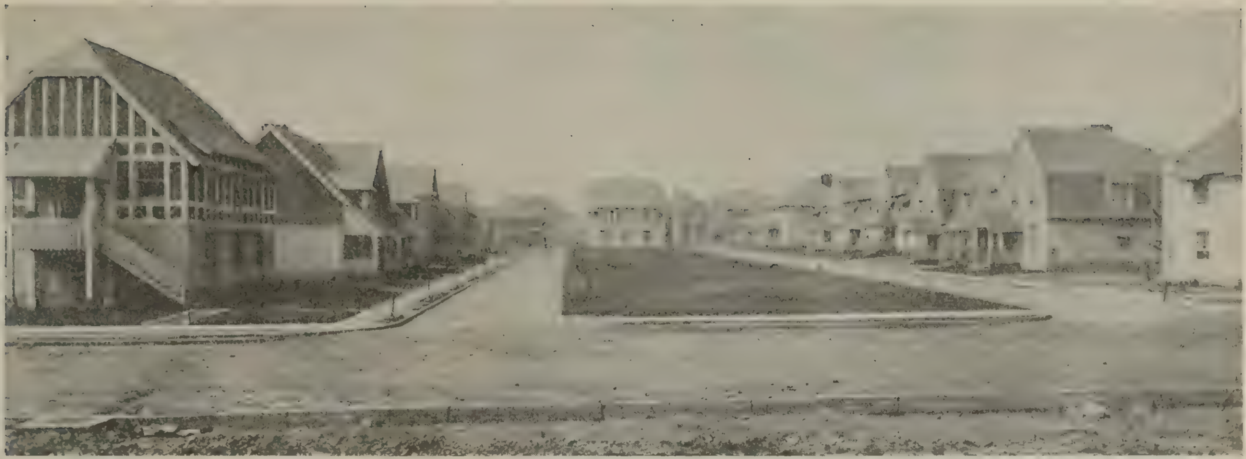
An artistic client must have an artistic building; a practical client, a practical building; a conservative client, a conservative building. Because the client is artistic, however, it does not follow that the building need not be practical. It should be practical, but first of all it must be artistic.

The builder or architect must, therefore, be a good reader of men. His ultimate success depends upon this. Generally his client knows vaguely what he wants, but it is difficult for him to picture it concretely to someone else. The architect supplies this gap and brings to life the thought which is in his client's mind but which he can express only hazily.

Materials are selected with due regard to the character of the building, which again depends upon the character of the man or people who are going to live in it. If it is a store, the determining factor is the character of the customer. In short, the character of the building depends upon the character of the person or people who are "paying the freight." When the character of the materials is determined, they are then selected with a view to getting the most for the money. This is the spirit that characterizes building today more than ever before.



A PICTURESQUE RESIDENCE IN GALVA, ILL.
Harry Aldrich, Architect



Rebuilding the City of Halifax

How Well the Halifax Relief Commission Did Its Work Is Shown in This Article

By A. J. R. Curtis

THE story of the recent permanent rehousing enterprise at Halifax, N. S., starts with an explosion in Halifax harbor on December 6, 1917. The explosion followed the collision of a Belgian relief ship with a steamer carrying a cargo of T. N. T. The force of the concussion seems to have been deflected toward a residential section in the northern portion of the city, probably due to the contour of the opposite hills as well as to the position of the ill-fated munitions ship.

DESTRUCTION WAS COMPLETE

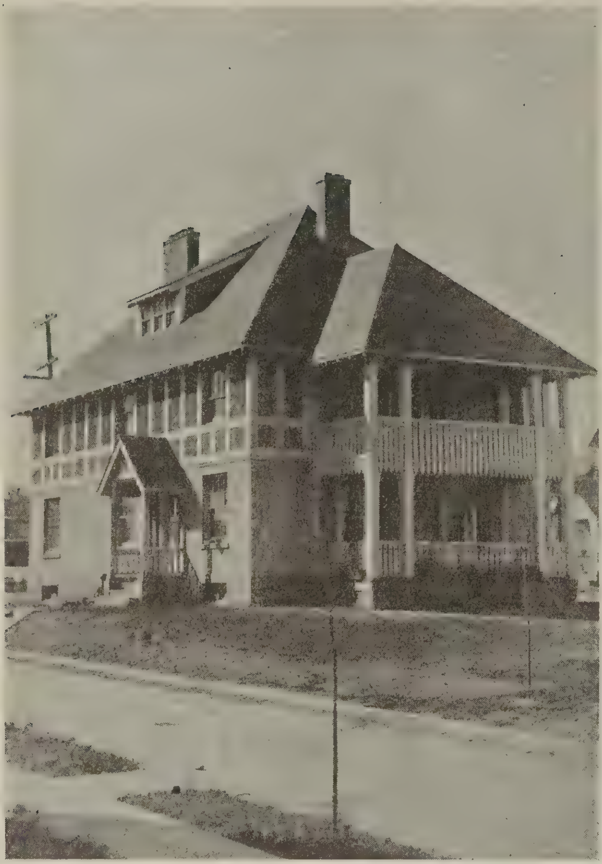
In an area of over two square miles not a structure of any description was left standing except a solitary building of heavy reinforced concrete construction. The wreckage immediately caught fire and the conflagration raged unrestricted until almost everything burnable in the district had been consumed. The blaze was finally extinguished and the finishing touches were put on the catastrophe by a furious winter blizzard. When the toll was counted, it was found that over 1500 lives were lost and many families left without shelter in the rigors of Nova Scotian winter.

On the Edge of the Destroyed Area.
Eight thousand houses like those at the right were repaired and made livable again.

Momentary relief measures came first. They were followed by the organization by the Canadian Government of the Halifax Relief Commission. In the short period of 20 months, this commission provided temporary quarters for 5,000 persons, entirely cleaned up the devastated area, repaired some 8,000 houses and built 700 houses of permanent construction. The commission retained as its architects, Ross and MacDonald of Montreal, and secured the able services of Thomas Adams, town planning advisor of the Dominion Government.

VARIETY IN TYPES OF HOUSES

The permanent housing includes a court development of 326 dwellings of concrete block construction, a few frame dwellings in a group, and a considerable number of scattered individual houses of concrete block. All of the buildings in the court development accommodate from two to six families. There are six general types of buildings containing four apartments each, which, with detail changes, give 24 different designs. Among the buildings housing six families each, there are five different general types

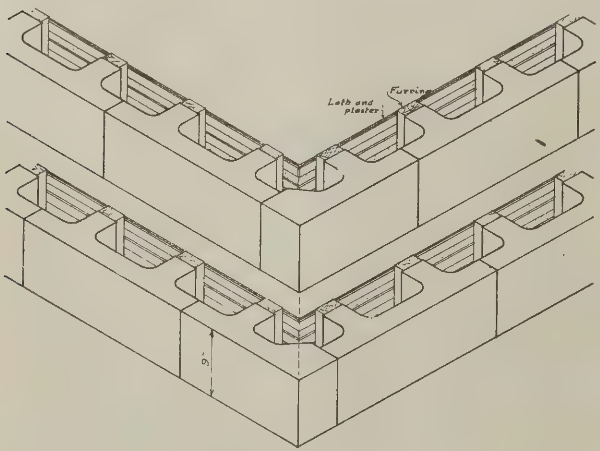


Large Type Two-Family House
Good architecture and material have combined to overcome prejudice against the concrete block.

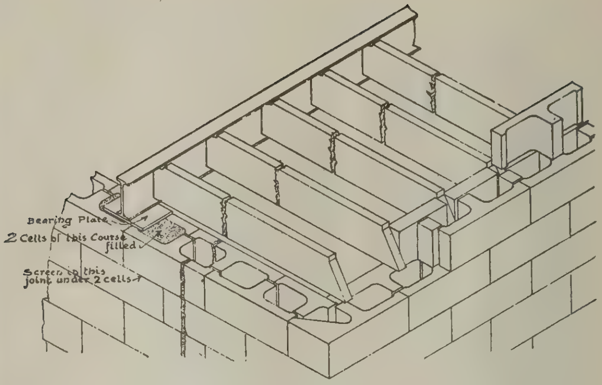
and among the two-family buildings there are six general types.

All of these houses are so arranged that each family has the use of individual front and rear entrances as well as porches. All entrances have vestibules. Electric lighting has been installed throughout, and the plumbing in kitchen and bathroom is modern. Laundry tubs have been placed in the basements. The method of heating is varied and consists of hot water, warm-air furnace and stove. The work was handled by the Richmond Construction Company, Halifax, on general contract.

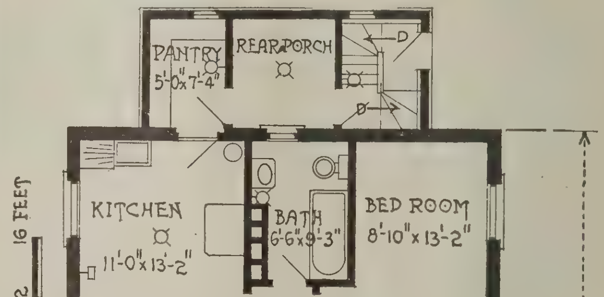
Foundations for all of the houses are of monolithic



Wall Construction
Above the first floor the walls are of single block construction, carrying furring strips, bishopric board and plaster or wood lath and plaster.


Bearing Plate
2 Cells of this Course filled
Screen in this joint under 2 cells

Double Wall Construction
Note arrangement of first floor joists.



TYPICAL FLOOR PLAN
House Illustrated Above

concrete, 12 in. in width. Subgrade conditions vary considerably, some of the houses being located on rock, others on deep fills and others on bog. Some of the footings go as deep as 5 ft. 6 in. below grade, although a depth of 4 ft. has been assumed to be sufficient to get below frost. All exterior surfaces of foundations are painted with an asphaltic compound and tile drains are laid around all walls, in most cases approximately on a level with the bottom of the foundations. All of the houses have good basements with concrete floors 4 ft. below grade.

Six-Family House
The upper story is of plain block and stucco without panels.

The walls, from grade to eaves, are of concrete block of the design shown in an accompanying illustration. The blocks are 24 in. long by 9 in. high, laid in ⅜ in. struck joints of 1:3 Portland cement and sand mortar. All block used on exposed portions of first story walls are faced with concrete made of a special facing of marble, feldspar and white Portland cement. This gives a pleasing color and texture. Some of the houses have upper walls of the same kind of block, but the greater number have plain rough surfaced block above the first story and carry two coats of gray Portland cement stucco divided off with half-timber panels. The stucco is applied directly to the concrete blocks and panel strips are attached to wooden plugs left in the mortar joints.

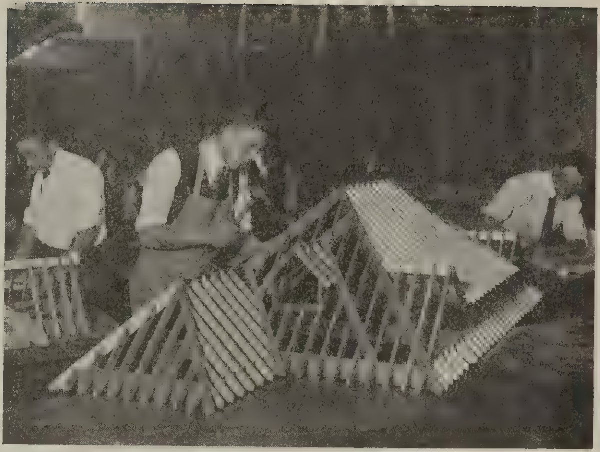
Two courses of double wall block construction are laid on the monolithic foundation, which terminates at grade. The inner row of block is discontinued at this point, being used to support the wooden floor joists. The outer single wall continues to the roof, the second floor being supported as shown in the illustration. Fire walls in all of the buildings are of 12 in. double wall construction to the roof. Chimneys are brick with a fire-clay flue lining. The sills and lintels, caps and other pieces of masonry trim are concrete, pre-cast in wooden molds, and surfaced with a mixture of white marble and white Portland cement.

To the lugs of the block 2″ x 3″ furring strips are attached. This provides a base for bishopric board, to which the plaster is applied. The roofs are covered with dark slate on wood frame, the latter being securely anchored to the walls by means of tie rods extending through the last two courses of block.

The Halifax houses have proved satisfactory from every viewpoint. They have been found to be equally well adapted for either rental or sale. The relief commission operates on both plans and houses in this area are occupied by installment purchasers and renters as well. The first cost of the concrete block houses was found to be 103 per cent. of the estimated cost of a frame and shingle structure, 102 per cent. of the cost of a frame with drop siding, 95 per cent. of the cost of brick and 89 per cent. of the cost of monolithic concrete. Moderate initial cost, combined with almost entire freedom from exterior maintenance, have made for these houses an unusually economical showing.

Four-Family House
There are 37 houses of this type.

In this issue we are publishing Part I of Mr. Van Gaasbeek's article on roof framing. We believe this article presents clearly the proper method of building a frame roof. This matter is of sufficient interest and contains sufficient information to warrant the space, and we are glad to present it to our friends interested in building. Part II will continue the story of roof construction, and will appear in March, and Part III will follow in April.—EDITOR.



How to Lay Out a Frame Roof

*By Richard M. Van Gaasbeek**

Part I

IN the March, 1920, issue of BUILDING AGE, pages 48 and 49, two illustrations are shown of photographs of a house at Lansdowne, Pa., designed by Heacock & Hokanson, architects. The appearance of the roof attracted the attention of the students in the roof framing classes at Pratt Institute, Brooklyn, N. Y., and they undertook to lay out a similar roof with such modifications as to embody as many of the principles of roof framing as possible in the one problem. The plan, Fig. 1, shows the basis of the study of the subject as outlined in this article.

ROOF FRAMING IS A FASCINATING PROBLEM

Roof framing is probably the most fascinating and interesting subject that the carpenter has to deal with, and one that is not generally understood. It is a study of the steel square, the knowledge of which is indispensable in layout work. It not only teaches mechanics how to use the square, but it teaches them how to think mechanically, and offers an excellent opportunity for them to learn plan reading, an understanding of which will materially help them to solve many unusual problems encountered in practicing their trade.

By the term, "plan reading," is not meant the taking off of quantities as generally implied, but the picturing in the mind of the mechanical construction of a project from a design or sketch submitted by an architect or owner. This foresight and an understanding of trade principles are both essential requirements in qualifying mechanics to make intelligent shop layouts from which can be listed the necessary dimensions (thickness, width and length) of all stock to be used in completing a given job. This is an art that a great many do not possess, but one that can be and should be acquired.

BEVELS MAKE THE PROBLEM DIFFICULT

The framing of a roof is developed on the plan, that is, all lines are laid out on a level surface. The intersections of the various center lines of the rafters give the necessary bevels at these intersections. In picking up the bevels from the plan, mechanics forget that they must also be applied on the same plane or on a level line. Many men cannot understand why such bevels taken from the plan cannot be applied directly on the top edge of the rafter, which in its relative position forms the pitch of the roof. It is not easy for them to picture in their minds a roof in elevation while looking at it in plan or on the layout.

It is a life study to understand the steel square thoroughly. Mechanics, with whom the writer works, and men he is trying to help, are handicapped because of lack of previous training. Very few have spent any time in the study of geometry, the law of angles and higher mathematics. The writer, therefore, has had to study the presentation of his subject with a view to avoiding the use of complicated diagrams, and he realizes that to be practical, the solution of a problem must first of all be simple. Further, it must be easy to remember when once solved. Simple, practical methods are used that can be easily under stood and mastered by the average mechanic.

---

* School of Science and Technology, Pratt Institute, Brooklyn, N. Y.

Space will not permit for a description of the terms used in roof framing, or a discussion of the application of the fence and square on the stock, but an effort will be made to simplify the picking up of the bevels, lengths and angles from the plan and transferring them on to the stock used in the roof.

STRENGTH OF ROOF MUST BE CONSIDERED

The strength of the roof should be considered in laying out. It should be so framed as to carry its own weight without sagging and it should be strong enough to support the weight of a heavy snowfall. Where possible all hips and valleys should have some tie with the ridge and plate. Although the entire length of the hip or valley may not be needed to get the desired outer effect of the roof, it will make a much stronger roof to run these timbers to the plate and cut jack rafters on either side of the hip or valley, rather than frame the jack in one length and stop the hip or valley in the center of the roof.

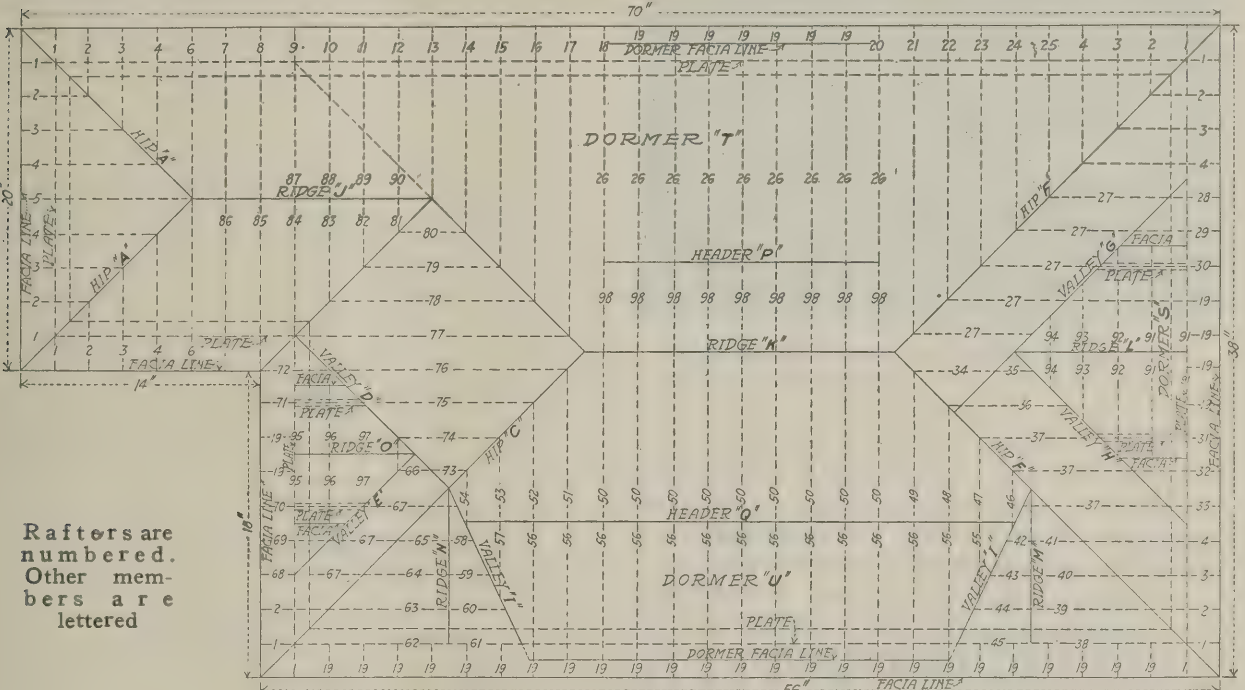


FIG. 1
WORKING PLAN OF ROOF

Figs. 2 and 3 show to elevations of the roof. These are intended to aid the student in studying the working plan of the roof shown in Fig. 1. While working from the plan the mechanic must picture these elevations in his mind. All measurements must be taken from the center line on the top edge of the rafter and either from a plumb line or level line. The plan of the roof shows only center lines of the rafters and ridges. It makes no difference, therefore, what size the timbers are, the length for corresponding runs will be the same.

METHOD OF TAKING MEASUREMENTS

Throughout the study it is important to keep this in mind and not forget the center line on the top edge. With a rafter intersecting a hip or valley, the measurements are taken to the center of the hip or valley. With a rafter intersecting a ridge the measurements are taken to the center of the ridge. After determining the lengths of the rafters, proper allowances must be deducted according to the size of the stock used in order to find the distance to the outer edge of the stock or the cutting length.

For example, where a hip or valley rafter intersects a ridge, deduct one-half the diagonal of the ridge from the hip or valley, AB, Fig. 4. Where a common or jack rafter intersects a ridge, deduct one-half the thickness of the ridge, CD, Fig. 4. Where a hip or valley intersects another hip or valley at right angles, deduct one-half the thickness of the hip or valley, EF, Fig. 4. Wherever a jack rafter intersects a hip or valley, deduct one-half the diagonal of the hip or valley, GH, Fig. 4. Taking the measurements from the top edge and on the center line of a rafter overcomes any variation in the sizes of the timber, brings the top edges in alignment for the roof boards and gives the actual length and a definite location for each and every rafter.

Laying Out the Roof

The first step in building a roof of this kind is to lay it out as shown in Fig. 1, laying out center lines only. The writer generally uses a 1″ scale, so that when measurements are taken from the layout, they may be called feet instead of inches, giving the full size measurements. That is, every measurement taken from the scale will be twelve times as long in full size. A measurement 6″ long on the layout would be 6′-0″ in full size; a measurement 12½″ long on the layout would be 12′-6″ in full size.

View Showing Roof Frame in Course of Construction
The cut at the head of the article shows the other side of the same roof.

The layout may be made on a sheet of detail paper or on a board. The accuracy of the layout will have a great deal to do with the correct lengths and fits of the rafters and will be a big time-saver in the long run. The measurements should be exact, as the least variation magnifies, so that the rafters will not fit the location intended for them. Number each rafter on the layout and give a corresponding number to the stock used, so that it can be readily identified.

Timber Sizes

In addition to the layout certain other information is necessary before the rafters can be laid out. The sizes of the timbers must be known, the width of the facia, the pitch, the projection and the height of the wall plate must be determined. The architect gives the pitch, facia and projection, or the lines of the building that are visible. Generally he does not give the lines that are unseen. The mechanic must know, therefore, how to develop his problem, to determine certain distances. Referring to Fig. 5, the rafter must have a good seat cut CE, but it must not be weakened between CD. These distances are a matter of judgment and are left to the discretion of the mechanic in laying out his work.

Lay in the lines of the rafter as shown to the required pitch. Measure down on the facia line AB from the top edge the width of the facia taken from the specifications and produce the plancher level. Measure in from the facia line the width of the projection and produce another line parallel to it for the wall line D. Determine upon the distance CD so that the rafter will stand the necessary weight that is likely to come upon it and lay in the plate level E. Measure the distance from the plate level E to the plancher level G. Since the plancher level and the plate level carry around the building on the same level, this distance as used on all rafters, common, jack, hip or valley rafters, is a constant measurement.

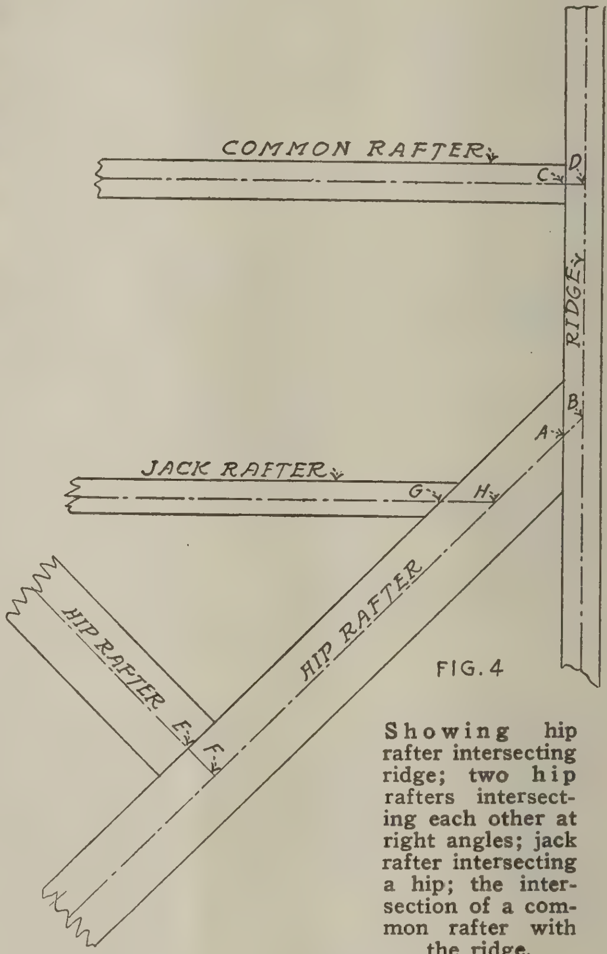


FIG. 4

Showing hip rafter intersecting ridge; two hip rafters intersecting each other at right angles; jack rafter intersecting a hip; the intersection of a common rafter with the ridge.

The following sizes of stock and measurements are those used in framing this particular model. The layout was made to 1″ scale and the model was also built to the same scale, making the problem an individual study which would not be possible in framing a full-size roof. The sizes of the stock were increased somewhat from 1″ scale to give better nailing and fastening, but this does not impair the appearance of the model or in any way affect the practical experience of the mechanic or the demonstration of the fundamental principles involved.

Sizes of Stock Used

Plate ⅞ x 2″
Hip and valley rafters ¾ x 1¼″
Common and valley rafters ⅜x⅞″
Ridge ⅜ x 1⅛″
Projection 2″
Facia ½″
Plancher level to plate level 1⅞″

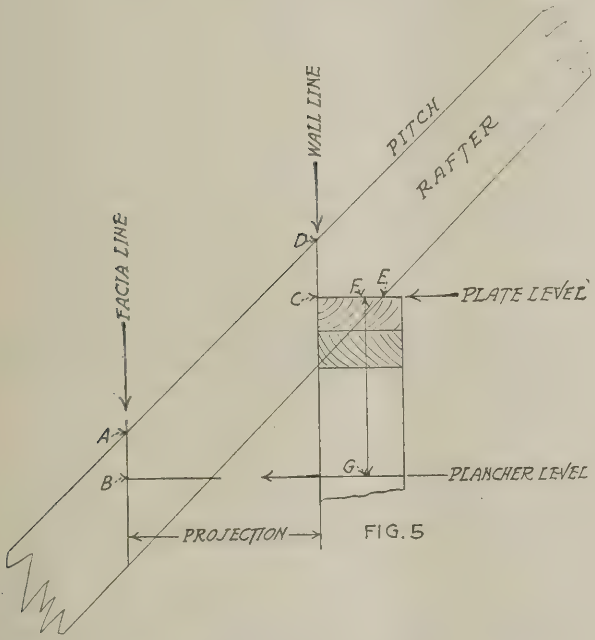


FIG. 5

Showing How to Provide a Good Seat for the Rafter Without Weakening It

Pitch 12″ in one foot (one-half pitch)
Dimensions(see plan)
Rafters spaced 2″ on centers

(To be continued)

Beauty vs. Service.

Shall a house be beautiful first and serviceable next, or shall it first be serviceable and the question of its beauty be secondary in importance? This is a question that will have as many different answers as there are people answering it, but we are just enough interested in knowing what *you* think to ask anyone who has some ideas on the subject to tell us about them. They need not agree with ours nor with anybody else's, but if they are good ideas we want to know about them. The best ideas we are going to print and pay for.

Of course, we have all heard that beauty is only skin deep. Just what does that mean? Can a person with a bad character inside be beautiful outside? Is such a person of any value to the community? Is a house of any value as a house if it has a perfectly beautiful exterior and interior but is so arranged that it is inconvenient and gives poor service?

Should a man be allowed to build such a house? Is it not the duty of the builder who is also building a reputation to call such defects to the prospective owner's attention, and even to refuse to build it if the owner insists? Does a layman know enough about a house to give the final decision on the matter? We want to know what *you* think.

Remember that the man who builds the house does not always live in it until it either burns down or is torn down. Perhaps he sells it and someone else must live in the house he has built.

Just where does the beauty of a house cease to be important, and where does its convenience and serviceability come in? Which is first for consideration, or are they both of equal importance?

We believe that builders are desirous to give people what they want and are interested in knowing how people in general feel about questions such as this. This is one reason for asking it.

We also believe that since builders come into contact with a large number of people of varying wants and tastes and since building has been a life study with them, they will have some valuable ideas and suggestions to offer.

For these reasons we would like to hear from builders, owners, prospective owners and renters. What do you think?

Keeping Building Costs

How One Contractor Keeps Costs Under the Cost-plus-fixed-fee Contract

*By F. A. Wells**

NO contractor who values his capital can afford to do without adequate cost records, both as a check on the job in progress and as a basis for future estimating. The simpler the system of accounting is, the better. Any refinements further than those necessary to give the actual data are a waste of time and money. Some contractors keep their books under their hats or in the left-hand pocket of their coats, where all invoices go preparatory to paying. At the opposite extreme are firms who maintain a complicated system of accounts, both at the job and at the home office.

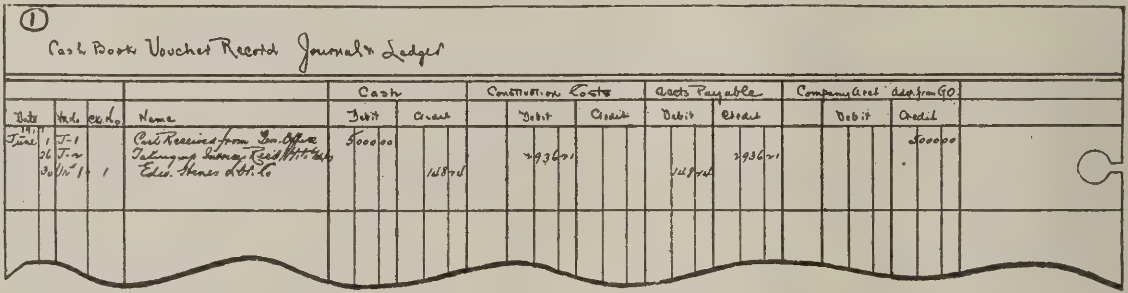
Accounting methods sufficient for the lump-sum contract may be insufficient for the cost-plus-fixed-fee contract, under which the owner and architect must have access to the accounts at all times. We have found the following system to be adequate for cost-plus jobs. With only a few changes this is the system put into effect on such work as the four warehouses we have built for Montgomery Ward & Co., at Chicago and Kansas City, the Butler Brothers' Chicago Mail Order Warehouse, Rand McNally & Company's Chicago publishing house, and other similar work in this country and Canada.

URGE OWNERS TO INSPECT BOOKS

Occasionally we have found an owner who prefers to be given such data as will permit his own accountants to keep a complete system of books. Generally, however, our accounts, kept on the job and open at all times for inspection, are considered sufficient, in view of the detail statements we render to the owner every two weeks. These bear the approval of the owner's representative, who is designated for that purpose. We urge owners to have their auditors frequently make examinations of accounts for their own satisfaction.

In the system we are now using, the combined *Cashbook, Voucher Record and Ledger* is used for the recording of all cash received. All cash disbursed by vouchers and all journal entries also appear here.

Invoices and payrolls are recorded in the combined *Invoice and Payroll Register*. The invoices and payrolls are numbered consecutively. This register has columns for date, invoice number, vendor's name, total amounts, both debit and credit and individual columns for the twenty main accounts used in distribution of costs. The register represents an absolute detail control of all approved charges against the job, since only audited and approved items are given a register number or entered. The payrolls are given register numbers and approved the same as invoices. The office copies of all invoices are filed in numerical order in an ordinary letter file drawer. These are bound in numerical order in lots of fifty to one hundred, using an ordinary heavy file folder for cover, clamping the invoice to the folder.



①

Cash Book Voucher Record Journal & Ledger

Date	Vch. No.	Ck. No.	Name	Cash Debit	Cash Credit	Construction Costs Debit	Construction Costs Credit	Accts Payable Debit	Accts Payable Credit	Company Acct. Adv. from G.O. Debit	Company Acct. Adv. from G.O. Credit
1914 June 1	J-1		Cash Received from Gen. Office	5000 00							5000 00
26	J-2		Taking up Invoice Reg'st 1 to 47			2936 21			2936 21		
30	Vr 1	1	Edw. Hines Lbr. Co.		148 76			148 76			

The *Detail Cost Record* is used for recording in detail the distribution of costs among the main accounts as shown on the Invoice Register.

When invoices come in from the vendors they are recorded in the *Accounts Payable* (*or Vendor's Accounts*) *Record*. After the invoices have been entered in the Invoice Register and Detail Cost Record they are entered as a credit to the vendor in Accounts Payable. Each vendor has a separate page or sheet. After the entry is made, it is placed in the file under the vendor's name until ready for payment. When payment is made, it is vouchered and charged to Accounts Payable (Vendor's Accounts) and Cash is credited.

---

*Vice-President Wells Brothers Construction Company, Chicago.

Purchase orders are made out in quadruplicate. The original is sent to the vendor; the duplicate is filed numerically in the order register; the triplicate is filed in the open order file under the vendor's name; the quadruplicate, which forms the material receipt or tally sheet, is filed by the office material clerk awaiting receipt of material. Upon receipt of materials, the office clerk checks and signs the material receipt portion of the order and files it complete with supporting delivery tickets, etc., while awaiting invoices. Upon receipt of the invoices they are checked against material receipt or tally sheet for receipt of material. Extensions, prices and footings are checked and certified. Cost distribution is checked and entered. The invoice is then audited for discount and cost distribution and certified. It is then passed to the superintendent for his approval and the approval of the owner's representative.

When the invoice is returned approved by the superintendent, the bookkeeper gives it the numerical register number and enters it in the Invoice Register. Only fully approved invoices are given a register number. The invoice is then posted to the credit of the vendor in Accounts Payable and a charge is made in the Detail Cost Record.

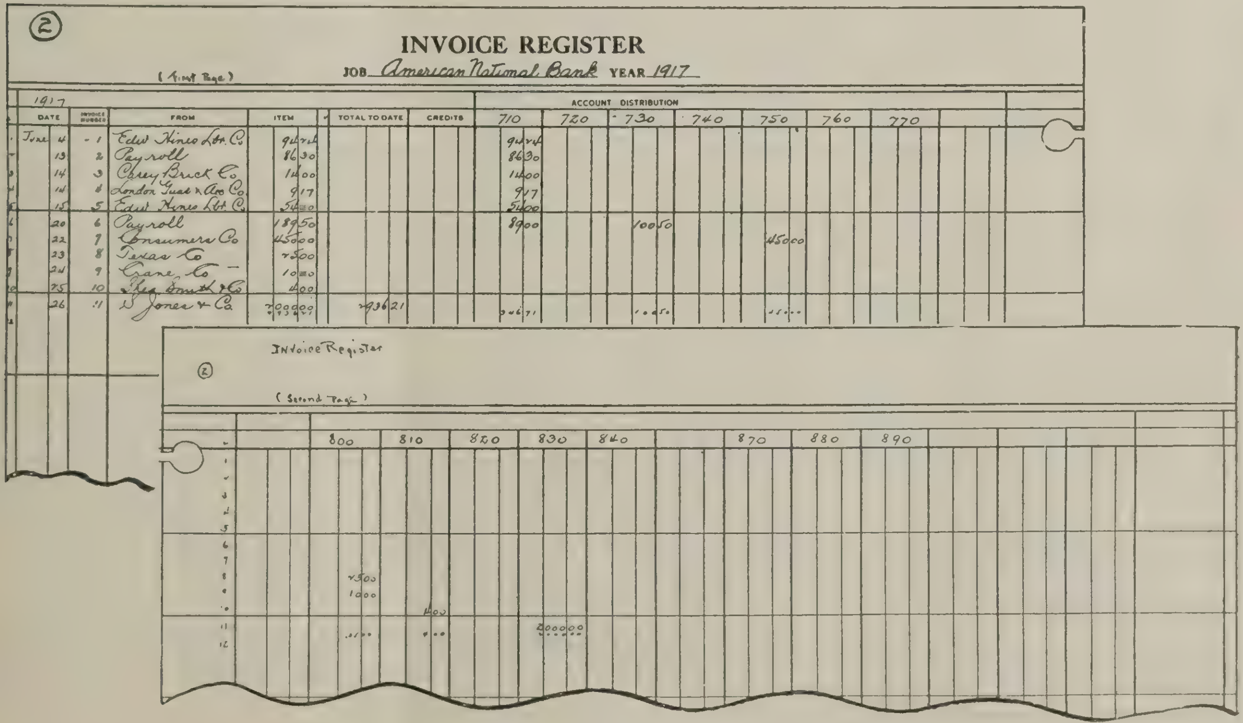
Accumulated totals in the Invoice Register are journalized in the Ledger, which is also the Voucher Record. This done at daily, weekly or semi-monthly periods, as is found practical.

We have found the voucher check system to be the most convenient. The voucher is made in quadruplicate at the construction office on the job and the approval of the owner's representative is often indicated on all copies of the voucher. The check or original voucher goes to the vendor, the duplicate to our general office for our records, the triplicate is kept as the job record and the quadruplicate is the owner's copy, which is forwarded to the vendor with the original, to be receipted by him and returned. At intervals we furnish the owner with a statement showing vouchers paid and receipted vouchers are attached.

FORM OF ACCOUNTING FOLLOWS FORM OF ESTIMATE

Since an important purpose of cost accounting is to give an adequate basis for future estimating, it is of importance that so far as practicable the form of cost accounting shall follow the form of an estimate. This is not practicable to the last subdivision of each of our general accounts, but it is sufficient to permit intelligent use of all cost figures. With such figures it is possible to compare not only final costs, but costs at any stage of the job, with the original estimated cost for that portion of the contract. We frequently divide our estimate by floors (in the case of a many-storied building) in order to have a check upon quantities and upon expenditure at several stages of the work.

We use the decimal system in the classification of



②

INVOICE REGISTER

(First Page)

JOB American National Bank YEAR 1917

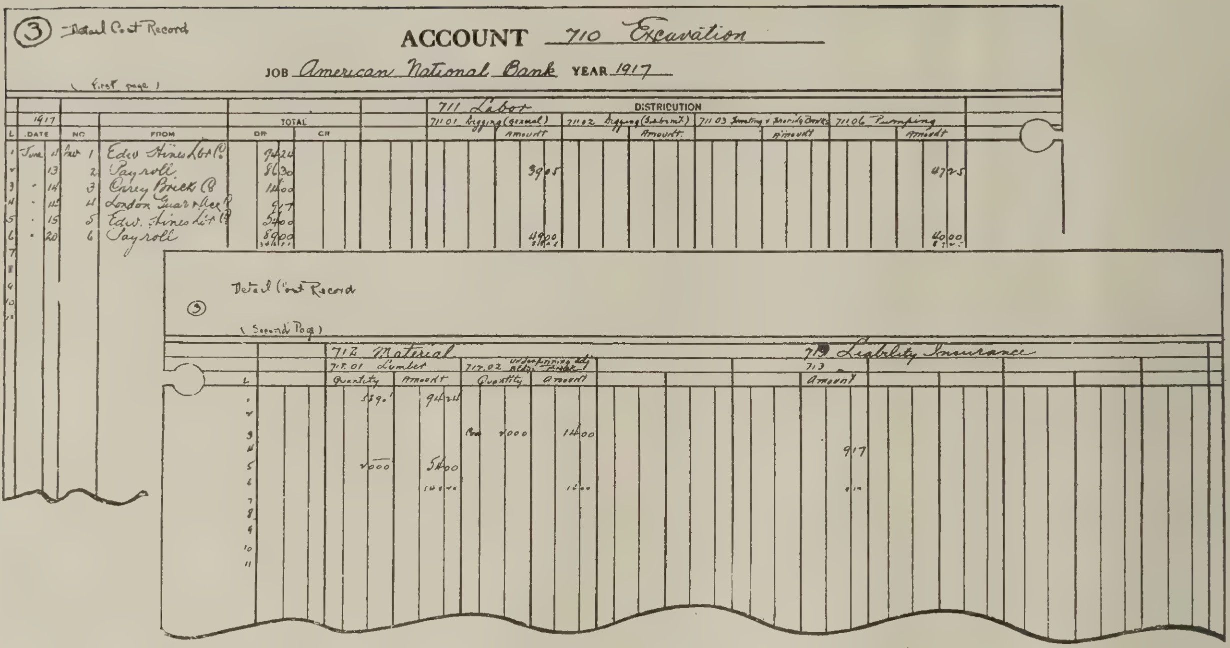
1917 DATE		INVOICE NUMBER	FROM	ITEM	✓	TOTAL TO DATE	CREDITS	ACCOUNT DISTRIBUTION 710	720	730	740	750	760	770
June	4	1	Edw Hines Lbr. Co	[illegible]				[illegible]						
	13	2	Payroll	86.30				86.30						
	14	3	Carey Brick Co	14.00				14.00						
	14	4	London Guar & Acc Co	9.17				9.17						
	15	5	Edw Hines Lbr. Co	54.00				54.00						
	20	6	Payroll	189.50				89.00		100.50				
	22	7	Consumers Co	450.00								450.00		
	23	8	Texas Co	75.00										
	24	9	Crane Co	10.00										
	25	10	Thos Smith & Co	4.00										
	26	11	S Jones & Co	2000.00		2936.21		[illegible]		[illegible]		[illegible]		

Invoice Register

②

(Second Page)

	800	810	820	830	840		870	880	890
1									
2									
3									
4									
5									
6									
7									
8	75.00								
9	10.00								
10		4.00							
11	[illegible]	[illegible]		2000.00					
12									



③ Detail Cost Record

(First page)

ACCOUNT 710 Excavation

JOB American National Bank YEAR 1917

L	1917 DATE	NO	FROM	TOTAL DR	TOTAL CR	711 Labor DISTRIBUTION 711.01 Digging (general) Amount	711.02 Digging (Subbasement) Amount	711.03 Sheeting & Shoring Banks Amount	711.06 Pumping Amount
1	June 11	Inv 1	Edw Hines Lbr Co.	94 24					
2	13	2	Payroll	86 30		39 05			47 25
3	" 14	3	Carey Brick Co	14 00					
4	" 14	4	London Guar & Acc Co	9 17					
5	" 15	5	Edw. Hines Lbr Co	54 00					
6	" 20	6	Payroll	89 00		49 00			40 00

③ Detail Cost Record

(Second Page)

L	712 Material 712.01 Lumber Quantity	Amount	712.02 Underpinning adj. Bldgs. Quantity	Amount	713 Liability Insurance 713 Amount
1	539'	94 24			
2					
3			Com 2000	14 00	
4					9 17
5	2000	54 00			
6		148 24		14 00	9 17
7					
8					
9					
10					
11					

our accounts. The classes of work which we shall discuss here number from 700 to 900, inclusive, and are used on all our construction jobs. Items embracing assets and liabilities appear on our general books and also have their range of numbers, but discussion of these will be omitted from this article.

DISTRIBUTION OF COSTS

The general distribution of construction costs is under the following headings:

710	Excavation
720	Caissons
730	Footings
740	Trench and wall
750	Concrete and fireproofing
760	Masonry
770	Carpentry
780	
790	
800	Plant expense
810	Field overhead
820	Extra work
830	Subcontracts
840	Extra work (subcontract)
850	
860	
870	Repair contracts
880	
890	Company expense (not chargeable to owner)

A subdivision of headings 710-790 is made between the items labor (1), material (2) and liability insurance (3). Thus, labor in excavation would be 711, material in excavation 712 and liability insurance in excavation 713.

SUBDIVISIONS BETWEEN MATERIAL AND LABOR

A further division of the various kinds of labor and material is made. The following classifications illustrate this point:

LABOR	
711.01	Digging (general)
711.02	Digging and subbasement
711.03	Sheeting and shoring banks
711.04	Shoring adjacent building

MATERIAL	
712.01	Lumber
712.02	Underpinning adjacent building
712.03	Rings (steel)
712.04	Cement.

For convenience we have listed the charges of labor and material in the order they usually appear in building construction costs:

LABOR	
.01	Digging (general)
.02	Digging subbasement
.03	Sheeting and bracing banks
.04	Shoring adjacent buildings
.05	Underpinning adjacent buildings
.06	Pumping
.07	Back-filling and grading
.08	Cutting old footings
.09	
.10	Placing laggings and rings
.10	Ventilating
.12.	Mixing and placing concrete
.13	Building forms, general
.14	Building forms, exterior columns
.15	Building forms, interior columns
.16	Building forms, spandrels
.23	Lay brick
.26	Bend steel
.35	Set cut stone
.44	Fit and hang doors
.56	Unload and handle material, etc.
.60	Clean up rubbish

MATERIAL	
.01	Lumber
.02	Underpinning adjacent buildings
.03	Rings (steel)
.04	Cement
.05	Sand
.06	Stone
.07	Brick
.08	Wall tie and inserts
.09	Steel (structural)
.10	Steel (reinforcing)
.11	Nails and wire
.12	Clamps, purchased or rented
.13	Tile
.14	Protection (lumber, etc.)
.15	Terra cotta
.16	Granite
.25	Frames and sash
.30	Interior trim
.35	Coping

Should charges be made in connection with carpentry or concrete and fireproofing (item 750) they would follow the same order as in excavation. For example:

CONCRETE AND FIRE-PROOFING	
751.12	(Labor)—Mixing and placing concrete
752.04	(Material)—Cement

CARPENTRY	
771.44	(Labor)—Fit and hang doors
772.25	(Material)—Frames and sash

Subdivision 800 covers plant expense and conforms with the subclassification of the 700 accounts as much as practicable. For example:

801	Excavation
802	Caissons
803	Footings
804	Sawmill
805	Concrete and fireproofing
806	Masonry
807	
808	
809	General (items charged to general equipment)

A further typical subdivision of the accounts under this heading is:

Form of Building Contract based upon Cost-Plus-Fixed-Fee

THIS AGREEMENT made this .... day of .... 19...., between

....

a domestic corporation hereinafter called the Owner, party of the first part, and WELLS BROTHERS CONSTRUCTION CO., a domestic corporation, hereinafter called the Contractor, party of the second part,

WITNESSETH, That whereas, the Owner desires to erect ....

....

.... in the City of ...., as hereinafter described, and in consideration of the mutual promises herein contained and of One Dollar ($1.00) by each party to the other in hand paid, the receipt whereof is acknowledged, it is agreed as follows:

Plans and Specifications when Completed Become a Part of this Contract.

Art. 1. The Contractor agrees to provide all the labor and material and to do all things necessary for the proper construction and completion of the

in conformity with the plans and specifications prepared and to be prepared by ....

.... Architect, said plans and specifications to be identified by the signature of the parties hereto and made part of this contract. If anything in the specifications is inconsistent with this agreement, the agreement shall govern.

Owner and Architect Must be Satisfied.

Art. 2. It is agreed that the work included in this contract is to be done under the direction of the said Architect and to the entire satisfaction of the said Owner and Architect, and that the decision of the Architect as to the true construction and meaning of the said plans and specifications shall be final and binding upon both parties hereto.

A Minimum of Subcontracts Stated in a Percentage of Total.

Art. 3. It is agreed that the Contractor will himself execute the main part of the work, namely, excavation, plain and reinforced concrete work, masonry, waterproofing, tile partitions, and rough and finished carpentry, and that no profit on the actual cost of material and labor entering into these branches shall go to any subcontractor. The work to be executed by this Contractor amounts roughly to sixty per cent (60%) of the cost of the completed buildings.

Owner and Architect Approve all Bids Before Letting of Subcontracts or Ordering of Materials.

Art. 4. After the approval of the plans and specifications by the Owner, the Contractor shall obtain bids for material, for labor and subcontracts from such responsible parties as are willing to make bids, and shall submit said bids to the Owner and Architect and shall co-operate in securing good competition and the best prices obtainable for labor, material and subcontracts thereon. All contracts for material and labor and all subcontracts shall be subject to the approval of the Owner and Architect and copies thereof filed with the Owner and Architect.

Builder Assumes Full Responsibility as Construction Manager for the Owner.

Art. 5. The Contractor recognizes the relations of trust and confidence established between him and the Owner by this contract. He covenants with the Owner to furnish his best skill and judgment and to co-operate with the Architect in forwarding the interests of the Owner. He agrees to furnish efficient business administration and superintendence and to use every effort to keep upon the work at all times an adequate supply of workmen and materials, and to secure its execution in the best and soundest way and in the most expeditious and economical manner consistent with the interests of the Owner.

Art. 6. The Contractor shall keep accurate and detailed books of account in the construction office at the building, open to the inspection of the Owner and Architect at all times. The Contractor will allow the Owner the benefit of any and all discounts taken or received and shall at all times act in good faith and to the best advantage of the Owner in the purchase of materials, in the employment of labor and in all its conduct and activities relative thereto.

Fixed Fee Payable in Installments During Progress of Work.

Art. 7. In consideration of the performance by said Contractor of all the covenants and conditions herein contained, the Owner agrees to pay to the Contractor the sum of ....

.... Dollars ($ ....) in addition to the actual net cost of the buildings as herein defined. Said sum of ....

.... Dollars ($ ....) to be paid as follows:

....

.... Dollars ($ ....) on the first of each month, commencing the .... day of .... 19 ......

Net Cost Defined Clearly to Avoid Possible Misunderstandings.

Art. 8. (a) By actual net cost set forth herein is meant all sums which the Contractor shall expend in the erection and completion of the buildings as called for by the plans, excepting office expenses, rent, salaries, light and other office charges of the Contractor at its main office in Chicago. The Contractor will not include in the cost of the buildings the salary of the executive officers of the corporation, or the Accounting and Contract Departments at its main office in Chicago, but the salary of its resident superintendent, auditor, foremen, clerks, etc., who may be located at the building for this contract, shall be included in the cost of the buildings.

(b) As part of the net cost of the building the Contractor will include the actual cost to the Contractor in the preparation, inspection, delivery and removal of materials, tools and equipment; all expenditures for superintendence and payrolls, all expenditures for transportation and traveling expense of the officers and employees of the company for expediting the work under contract; the cost of equipment and expense of temporary office at the building; the cost of liability and compensation insurance. The plant and equipment required for the work shall be included in the cost of the building on a monthly rental basis, as per schedule hereto attached and made a part of this agreement. All perishable tools, materials and supplies delivered to the building by the Contractor for temporary purposes shall be charged to the cost of the work not exceeding standard market prices, subject to the approval of the Owner or his authorized agent. The lumber furnished shall be charged as part of the cost of the work at its cost to the Contractor. All lumber and other materials and supplies left over after completion shall be sold on the premises for the best prices obtainable after five days' notice in writing by the Contractor to the Owner, and the proceeds will be paid to the Contractor and credited as a reduction in the cost of the buildings.

90% of Savings Under Preliminary Estimate Accrues to Owner.

Art. 9. Whereas, it has been decided to erect the buildings above described, and whereas a careful and conservative estimate of the entire cost of the buildings shows that it should not exceed the sum of ....

.... Dollars ($ ....) including the before mentioned fee of ....

.... Dollars ($ ....) the Owner will pay the Contractor ten per cent (10%) of any saving effected below the figure.

Operation Financed with Owner's Funds Advanced Semi-Monthly.

Art. 10. (a) The Contractor and Owner especially agree that the Owner will provide funds at all times in ....

.... for the payment of all payrolls, bills for material, and local expenditures on the work included under this contract, and to provide funds for discounting all bills for materials and supplies of every kind for the benefit of the Owner as far as discounts may be obtained. These payments shall be considered as advances on account of the contract and shall be credited on the semi-monthly estimates for payment. All payments by the Owner to the Contractor under this contract (except payments on account of the Contractor's fee), shall be deposited in a special bank account established by the Contractor for this contract. All checks against this special bank account will require the counter-signature of the Owner's representative.

(b) The Contractor will render to the Owner or the Owner's authorized representative on or about the 1st and 15th of each month, a statement of the expense, payrolls, bills for material, tools, subcontractor's estimates, vouchers, etc., for payment. This statement will constitute the Contractor's application for payment and shall be checked and approved by the Architect and the Owner or his authorized agent, whereupon the amount shown to be due by the approved statement shall be paid in current funds. Payrolls to be verified under oath if required. If vouchers be not objected to in writing within 30 days after delivery to the Owner or his authorized agent, the items of expenditure embraced therein shall be deemed to be approved by the Owner.

Builder Guarantees Owner Against Suits and Claims.

Art. 11. (a) The Contractor shall procure for the Owner and Contractor and deliver to the Owner, policies for workmen's compensation, public liability in $10,000 and $20,000 limits, or such higher amounts as may be desirable at the Owner's option, and Owner's contingent liability insurance in the London Guarantee & Accident Co., Limited, casualty and payroll insurance, and the net premiums for the same shall be charged as part of the cost of the buildings. And the said Contractor hereby agrees to save and to hold harmless the said Owner of, from and against all suits, claims and demands based upon any alleged injury to persons which may occur or be alleged to have occurred by or on account of any act or omission on the part of the said Contractor, the subcontractors or any of their servants or agents.

(b) The Owner agrees to carry fire and tornado insurance covering all materials, equipment, construction work, etc., in and around the building, protecting the parties hereto as their interests may appear. It is especially agreed that the Contractor shall not be held responsible or liable for any loss, damage, detention or delay caused by fire, cyclone, strikes, lockouts, civil or military authority, insurrection or riot, or other causes beyond the control of the Contractor.

Definite Promise of Delivery.

Art. 12. All work in connection with said buildings shall be carried on with all possible speed consistent with reasonable cost, good workmanship and safety of construction and whereas, time is the essence of this contract, the Contractor agrees to commence work immediately after the site for same is delivered to him by the Owner. It is agreed that the erection of said buildings shall progress continuously except for strikes, lockouts, and the acts of God, or other delays beyond the control of the Contractor, with the intent that the buildings shall be ready for substantial occupancy on or before the expiration of .... months from the date that site for the building is delivered to the Contractor by the Owner.

"Changes" Bring No Added Profit to Builder.

Art. 13. The Owner or Architect, may from time to time, by written instructions to the Contractor, make changes in the drawings and specifications, issue additional instructions, require additional work or direct the omission of work previously ordered, and the provisions of this contract shall apply to all such changes, modifications and additions with the same effect as if they were embodied in the original drawings and specifications. The cost of all such changes is to merge in the final cost of the work. No changes involving additional cost shall be made in the work under this contract except upon written order of the Architect or Owner. The amount to be added to the estimated price under this contract on account of such changes shall be the estimated cost to the Contractor for doing the work, including liability insurance, plus ten per cent (10%) for a margin of safety to protect the Contractor's portion of any savings below the estimated price.

No Profit on Temporary Heat.

Art. 14. No temporary heat is included in the estimated price; should temporary heat be required in order that the work may proceed during cold weather, the Architect or Owner shall authorize such temporary heat, as an addition to the estimated price on the basis of actual cost to the Contractor, including liability insurance, plus ten per cent (10%) for a margin of safety to protect the Contractor's portion of any savings below the estimated price.

It is especially agreed that the term "Temporary Heat" includes all preparation for the temporary heating of the building and for the heating of concrete and masons' materials; the furnishing of temporary heat; all salamanders, stoves, labor, attendance, liability and compensation insurance, all temporary enclosure of the buildings with canvas or otherwise, all preparation for, and all thawing of ice and snow from the forms with steam or otherwise.

Owner May Compel Employment of Adequate Forces

Art. 15. Should the Contractor at any time refuse or neglect to supply a sufficiency of properly skilled workmen, or of materials of the proper quality, or fail in any respect to prosecute the work with promptness and diligence, or fail in the performance of any of the agreements herein contained, such refusal, neglect or failure, being certified by the Architect, the Owner shall be at liberty, after five days' written notice to the Contractor, to provide any such labor or materials and charge the cost thereof against the estimated price under this contract; and if the Architect shall certify that such refusal, neglect or failure is sufficient ground for such action, the Owner shall also be at liberty to terminate the employment of the Contractor and to enter upon the premises and take possession, for the purpose of completing the work included under this contract, of all materials, tools and appliances thereof, and to employ any other person or persons to finish the work and provide the materials therefor; and in case of such discontinuance of the employment of the Contractor, it shall not be entitled to receive any further payment under this contract until said work shall be wholly finished, at which time, if there shall be an unpaid balance due to be paid to the Contractor under this contract, the same shall be audited and certified by the Architect and be paid by the Owner to the Contractor. The Architect shall also adjust the Contractor's fee under this paragraph, on the prorate basis of work performed by the Contractor.

Arbitration Provided in Case of Dispute.

Art. 16. Except as herein otherwise provided, it is mutually agreed that should any dispute arise under this contract, between the Contractor and the Owner, either during the progress of the work or after the termination thereof, or the abandonment or breach of this contract as to the quantity or quality of work done hereunder, or as to any matter of payment or amount of payment to be made hereunder, or as to any matter of loss or allowance under this contract, then such matter in controversy shall be referred to three arbitrators; one to be chosen by each of the parties to this agreement and the third arbitrator to be chosen by the other two arbitrators so selected, before proceeding to the business of arbitration; and the decision of any two of said three arbitrators shall be final and conclusive upon all parties hereto and such determination shall be a condition precedent to the right of action by either party as against the other. Each party hereto shall pay one-half of the expense of such arbitration.

IN WITNESS WHEREOF, the parties to these presents have hereunto set their hands and seals, this .... day of .... 19 .

....

EXCAVATION

801.1 Transportation (of equipment plant)
801.2 Erection of equipment
  801.21 Labor
  801.20 Material
801.3 Equipment on charge and credit basis
  801.31 Labor
  801.32 Material
801.4 Rental of equipment
801.5 Fuel, lubricants and power
801.6 Repairs
801.7

Should charges be made to the plant in connection with concrete and fireproofing, they would be charged as 805 with divisions shown above.

CLASSIFICATION OF FIELD OVERHEAD

811 *Salaries—General Labor and Expense*
  811.1 Superintendent and engineers
  .2 Office employees
  .3 Material men and timekeepers
  .4 Laying out building
  .5 Watchman
  .6 Water boys
  .7 Toolmen
  .8 Liability insurance, superintendent and watchman
  .9 Traveling expenses, superintendent, engineer and office men
812 *Engineering Expenses*
  812.1 Plans, detail and engineering supplies
  .2 Photographs
  .3 Engineering service
  .4 Architect's fees
  .5 ....
  .6 ....
  .7 ....
  .8 ....
  .9 ....
813 *Office Expense*
  813.1 Rent, light and heat
  .2 Stationery and printing
  .3 Telephone
  .4 Telegraph
  .5 Postage and expressage
  .6 Rent on adding machine and typewriters
  .7 Furniture
  .8 ....
  .9 Miscellaneous office expense, towels, etc.
814 *Other Field Expenses*
  814.1 Bonds (maintenance and construction)
  .2 Permits and licenses, boiler inspection
  .3 Fire insurance
  .4 Legal services
  .5 Burglar insurance
  .6 Association dues
  .7 Advertisements
  .8 Floor tests
  .9 Ring tests
815 ....
816 *Temporary Structures (Labor and Material)*
  816.1 Offices
  .2 Toilets
  .3 Toolhouse, blacksmith shops, storage sheds, etc.
  .4 Stairs and ladders
  .5 Fences, sidewalks, covers and other enclosures
  .6 Temporary platform and driveways
  .7 ....
  .8 Repairs and protection to adjacent property
  .9 Protection to public utilities
817 ....
818 *Temporary Light, Heat and Power*
  818.1 Light
  .2 Heat
  .3 Power
  .4 ....
  .5 ....
  .6 ....
819 *General Cleaning*
  819.1 Labor
  .2 Teaming
  .3 ....
  .4 ....
  .5 ....
820 *Extra Work*
  821.1 Use as many numbers as accounts charged.
  822. ....
830 *Subcontracts*
  831. Wrecking, excavating and shoring, etc.
    831.1 Wrecking contract
    .2 Excavation contract
    .3 Shoring contract
    .4 ....
832 *Heating, Plumbing, Wiring, Elevators, etc.*
  832.1 Subheading for each kind of subcontract
833 Interior construction
834 Painting and glazing
835 Millwork
836 Roofing
837 Fireproof doors and windows
838 Interior finish
839 Structural steel.
840 *(Extra Work) Subcontracts*
  841. Subheading for each kind of work done
850 ....
860 ....
870 *Repair Contracts* (for small jobbing contracts)
890 *Company Expense* (not charged to owners)
  891 Subheading for each kind of expense

At stated periods we take from the cost records a summary and detail statement of construction costs in the following form:

Acct. No.	*Name of Account*	*Item Amount*	*Cost per Unit*	*Est. Cost*	*Diff.*

Figures in the last column appear in red when costs are running above estimate. Naturally the red items will have careful scrutiny to ascertain why these costs are above estimate. This statement is primarily for our own use, but the owner may have a copy if he wishes.

Under the cost-plus-fixed-fee contract the owner generally furnishes the funds to finance the contract. We maintain an entirely separate bank account for each cost-plus contract representing the owner's funds. When agreeable to the owner we arrange for the owner's representative to countersign all checks drawn by us on this account. At the start of the work we furnish an estimate of the anticipated amount of labor and material bills covering an initial period of two weeks or more to the owner, who then advances the funds to cover these requirements.

The advantages of having all accounts handled at the job are apparent. The distribution, if not clear from the purchase order, can be referred to the superintendent, and the fact that the books of accounts are at all times open for the owner's inspection is an assurance to him of honest treatment. His approval of purchases of materials before they are made and his opportunity to question invoices prior to payment leaves the control with him and prevents the accumulation of minor, disputed items, which if left for settlement until the completion of the contract might not be readily explained.

We have used this system of accounting with entire satisfaction to our clients. This is adequate proof that the cost-plus contract is workable and that the owners not only feel safe, but prefer this method because under it 90 per cent. of the savings under the preliminary estimate accrue to the owner.

The building of a relationship which will insure repeat orders is just as important in contracting as in merchandising.

A New Idea in Lighting Fixtures

The Portable Feature Has Many Advantages

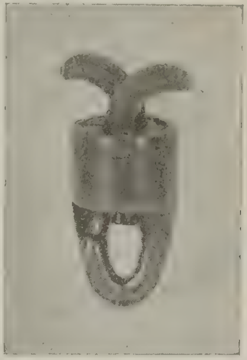
THE general public, as well as the electrical contractor, has been interested in a new design of electric outlet for use in homes, offices, public buildings and everywhere that electric wiring and electric lighting are used. The purpose of these outlets is to give every house or building a system of wiring that will be flexible enough to meet all conditions without the necessity of alterations or additions to the circuits already installed.

The design and construction of the new outlet are shown clearly in the accompanying illustrations. They are intended to be located in different places in the walls and ceilings so that wall lights and ceiling lights may be attached to them directly without the use of an extension cord. In fact, any electrical appliance may be readily attached to these outlets. Each room has more outlets than are necessary at any one time. When not in use they are covered by paintings or they are painted in keeping with the wall decorations, so that they are invisible. The plugs for the ceiling outlets are designed strong enough to carry the heaviest chandeliers made.

The provision for many more outlets in each room than are necessary at one time permits the lighting to be arranged to suit the individual taste of the occupant. It permits a ceiling light here, a desk light there and a wall light in the alcove. When the furniture is rearranged, the lights may be located to suit.

It is often desirable that the lighting fixtures in a room be in keeping with the style of furniture. When moving into another house this is not easily possible if the lighting is fixed, but it is easily accomplished with the new outlets and changeable lighting fixtures. The lighting then becomes a part of the room. The style of fixture is selected to harmonize with the furniture.

In offices these outlets are also valuable. When it is necessary to move to new space or for any reason to alter the partitions in the present space, these outlets lend themselves readily to the new arrangement. Partitions may be run without thought of the wiring on the floor, because there will always be an outlet where it is needed.

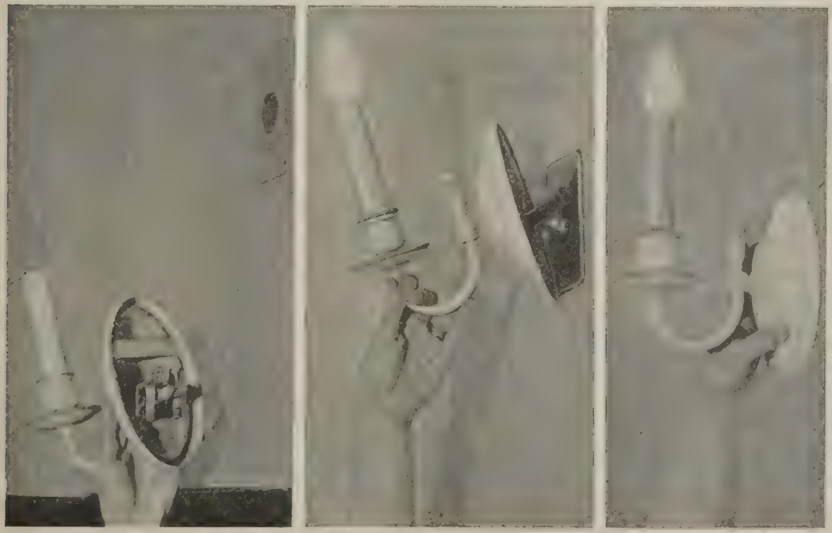


Ceiling Plug

The ceiling plug is designed to support the heaviest chandelier, and its rigidity increases in proportion to the weight that it supports.

The expense and inconvenience of making alterations in electrical wiring has often prevented changes in the lighting of buildings, rearrangement of furniture and rearrangement of office partitions, even though such changes would be desirable and economical. The new outlet system of lighting eliminates the expense, the dirt and the inconvenience.

The Electric Outlet Company, New York City, is making these new outlets. This company foresees the day of standardization of electrical fixtures.



Mounting the Fixture

The method of placing a portable fixture in a wall outlet is shown here. The operation is simple and is accomplished in the same way that a plug is inserted in a socket. Such outlets as these are located in convenient places in the room. The lighting scheme then becomes entirely flexible and may be readily suited to the style or arrangement of the furniture.

Brick Round Barn
with Shingle
Roof

Agricultural School
St. Bede College
Peru, Ind.

Economy Applied to Dairy Barns

Some Pointers on the Advantages and Methods of Construction of the Circular Type of Barn

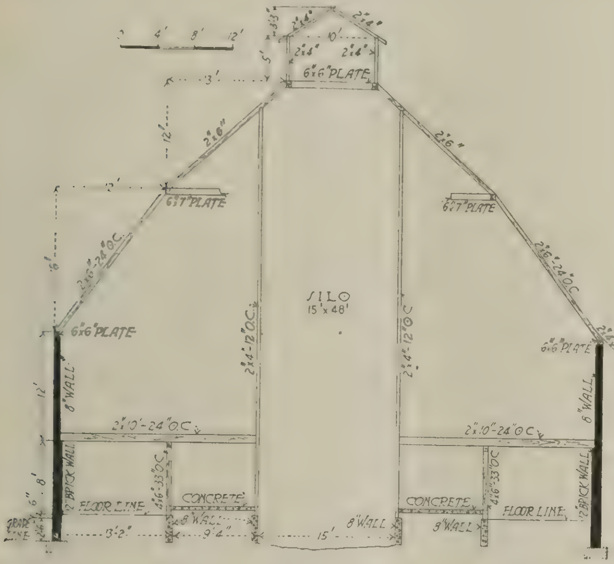
THE planning, construction and arrangement of farm buildings do not usually receive the thought and study these subjects warrant. How many dairymen have compared a circular, 40-cow barn with the common rectangular building containing the same area? How many understand that the circular structure is much the stronger; that the rectangular form requires 22 per cent. more wall and foundation to enclose the same space; and that the cost of material is from 34 to 58 per cent. more for the rectangular building?"

Thus queries Mr. W. J. Fraser of the Agricultural Experiment Station, University of Illinois, who, in a bulletin on the subject, points out the economy of the round barn and shows that it possesses many points of superiority over the rectangular one.

The builder who has a chance to obtain work of this character will do well carefully to study the points set forth. He will learn that the desired dairy barn may be built at a cost not greatly in excess of "before the war" days. Point out to the farmer that you can give him a square deal by building a round barn. If prices aren't coming down, let's adopt more economical methods of building and so do our share in getting a real building program started. Now to Mr. Fraser's story.

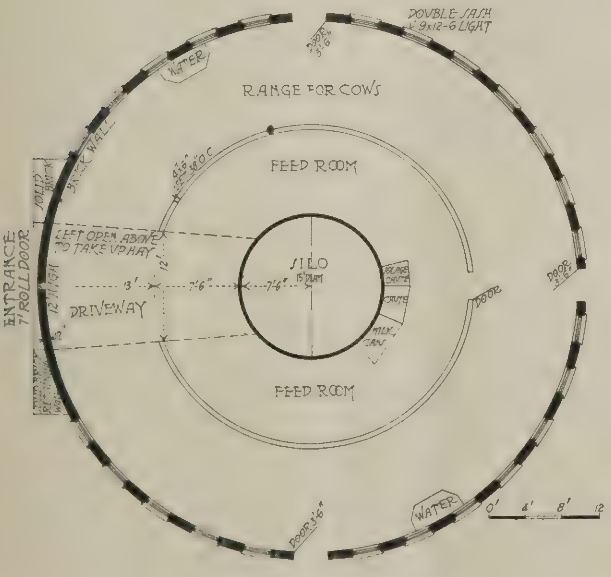
WHY MORE ROUND BARNS ARE NOT BUILT.

IN an early day when lumber was cheap, buildings were built of logs, or at least had heavy frames. Under these conditions, the rectangular barn was the one naturally used, and people have followed in the footsteps of their forefathers in continuing this form of barn. The result is that the economy and advantages of the round barn have apparently never been considered. This is because they are not obvious at first sight, and become fully apparent only after a detailed study of the construction. For these reasons, the rectangular form still continues to be built, although it requires much more lumber. As the price of lumber has advanced so materially in recent years, the possible saving in this material is a large item, and well worth investigating.



Cross Section, Barn at St. Bede College

The objections to round barns have usually been made by those who have only a superficial knowledge of the subject, and do not really understand the relative merits of the two forms. To the writer's knowledge, there has never been published a carefully figured out, detailed comparison of a properly constructed circular barn with the rectangular barn.



Plan, Barn at St. Bede College

The difficulty with most round barns that have been built, thus far, is that they do not have a self-supporting roof, and consequently lose many of the advantages of a properly constructed round barn. This is the principal reason why round barns have not become more popular. A straight roof necessarily requires many supports in the barn below. These are both costly and inconvenient, and make the roof no stronger than a dome-shaped, self-supporting roof which nearly doubles the capacity of the mow. See Fig. 1.

Many who have thus disregarded capacity have also wasted lumber and made a needless amount of work by chopping or hewing out the sill and plate, this requiring more labor and lumber, besides sacrificing the greater strength of a built-up sill. Rightly constructed round barns are, however, being built to a limited extent. One contractor has erected twenty-four round barns, with self-supporting roofs, in the last nine years. These barns vary in size from 40 feet in diameter with 18-foot posts to 102 feet in diameter with 30-foot posts.

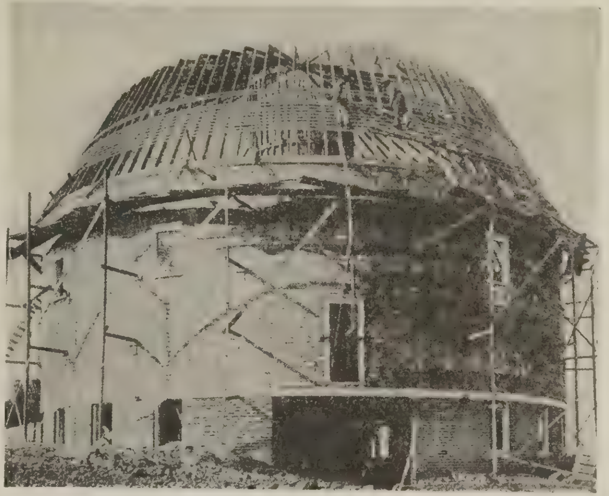
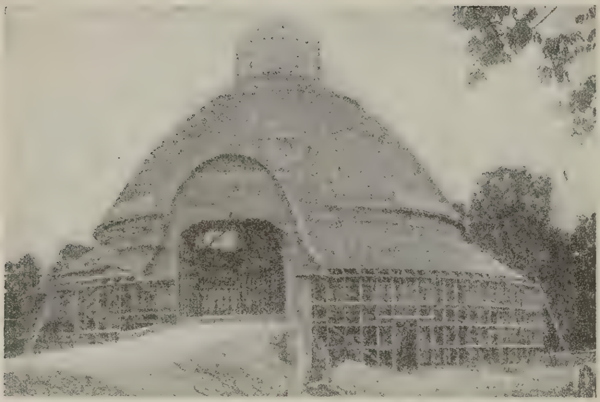


Fig. 1. This illustration of a Circular Frame Barn Under Construction Shows All Rafters in Place and Method of Sheathing Roof

Another reason for the scarcity of round barns is the difficulty in getting them built. Most carpenters hesitate to undertake the work because in the erection of a round barn the construction should be entirely different from that of the rectangular form Many new problems present themselves, but when these are once understood, the round barn offers no more difficulties in construction than the rectangular form. It is, however, important to have a head carpenter who is accustomed to putting up round barns,



Another Type of Round Barn. Hoops in Place Ready for Perpendicular Siding; Roof Sheathed for Shingles

as a man with ingenuity and experience can take advantage of many opportunities to save labor and material.

ROUND BARN MOST CONVENIENT.

CONSIDERING that the barn on a dairy farm is used twice every day in the year, and that for six months each year the cows occupy it almost continuously, and that during this time a large amount of the labor of the farm is done inside the barn, it is evident that the question of its convenience is a vital one. The amount of time and strength wasted in useless labor in poorly arranged buildings is appalling. People do not stop to consider the saving in a year or a lifetime by having the barn so conveniently arranged that there is a saving of only a few seconds on each task that has to be done two or three times every day.

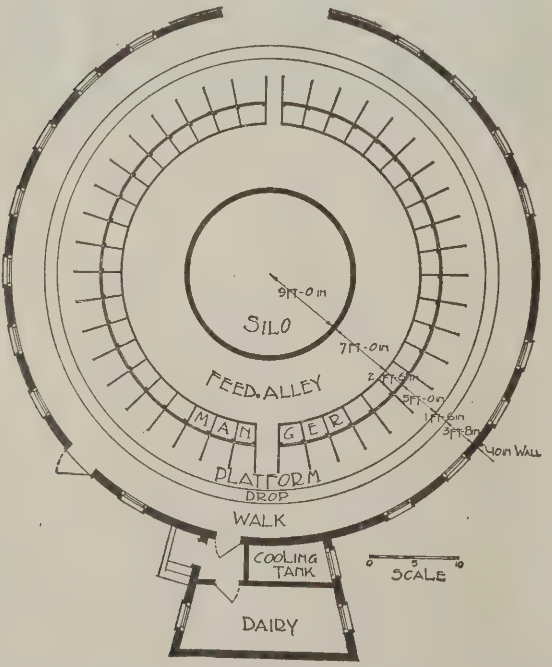


Fig. 2. Showing How a 60-Foot Round Barn May Be Arranged to Accommodate 40 Cows in Stalls

OTHER ADVANTAGES

The round barn has a special advantage in the work of distributing silage to the cows. The feeding commences at the chute where it is thrown down, and is continued around the circle, ending with the silage cart at the chute again, ready for the next feeding. The same thing is true in feeding hay and grain.

Still another great advantage is the large unobstructed hay mow. With the self-supporting roof, there are no timbers whatever obstructing the mow, which means no dragging of hay around posts or over girders. The hay carrier runs on a circular track around the mow, midway between the silo and the outside wall, and drops the hay at any desired point, thus in no case does the hay have to be moved but a few feet, which means a saving of much labor in the mowing.

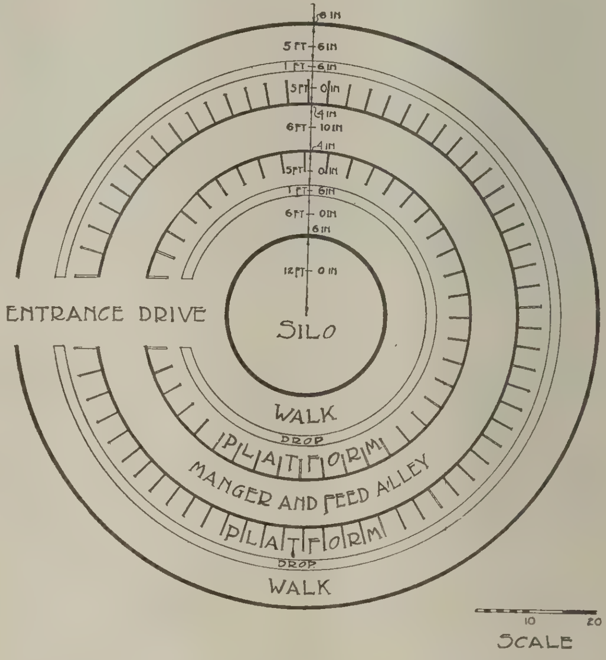
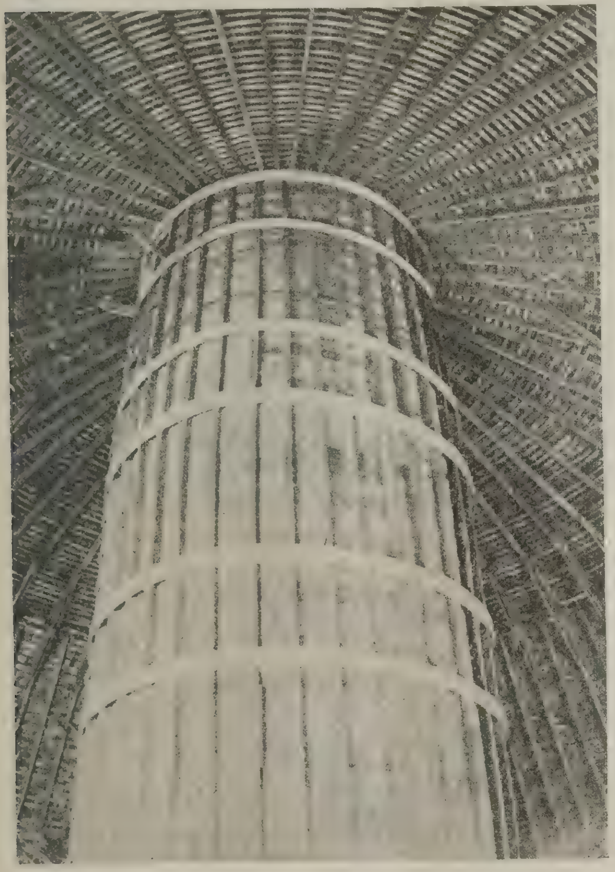


Fig. 3. Arrangement of Cow Stable in Round Barn 90 Feet in Diameter. Two Rows of Cows Headed Together

To embody successfully all of the above discussed advantages in a dairy barn is one of the large problems in milk production. In a careful study of the barn question it soon became apparent that it was impossible to embody all of the requirements advantageously in anything but a circular form of building.

Circular Barn Is Stronger

The circular construction is also stronger, because it takes advantage of the lineal, instead of the breaking strength of the lumber. Each row of boards running around the barn forms a hoop that holds the barn together. A barrel, properly hooped and headed, is almost indestructible, and much stronger than a box, although the hoops are small. This strength is because the stress comes on the hoops in a lineal direction. Any piece of timber is many times stronger on a lineal pull than on a breaking stress. Take for example a No. 1 yellow pine 2 x 6 in., 16 feet long, with an actual cross section of 1⅝x 5⅝ inches. If placed on edge and supported at the ends, as a joist, the limit of safety for a load evenly distributed is 642 pounds, while the limit for safety for a load in the lineal direction of the same piece of timber is 12,800 pounds, or twenty times as great.



Note Height of Silo, Capacity of Barn, and Construction of Roof. See Also Fig. 4

All exposed surfaces of a round barn are circular, as both the sides and roof are arched, which is the strongest form of construction to resist wind pressure; besides, the wind, in striking it, glances off and can get no direct hold on the walls or roof, as it can on the flat sides or gable ends of a rectangular structure. If the lumber is properly placed in a round barn, much of it will perform two or more functions. Every row of siding boards running around the building serves also as a brace, and the same is true of the roof boards and the arched rafters. If the siding is put on vertically and the roof built dome shaped, no scaffolding is required inside or out. These are points of economy in the round construction.

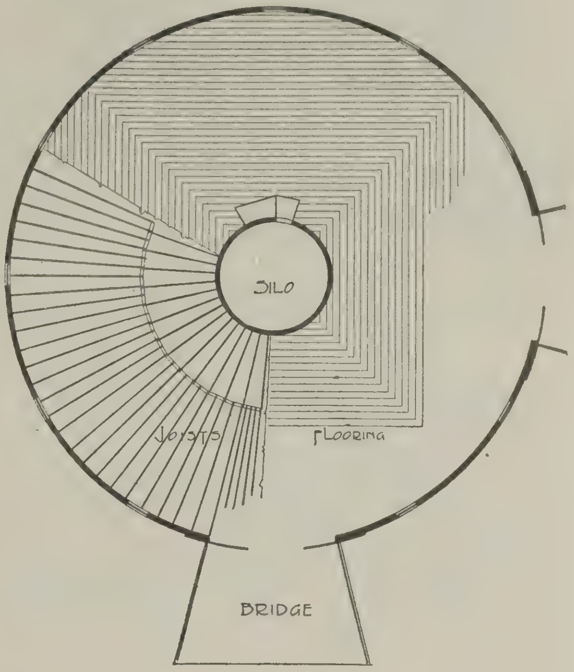
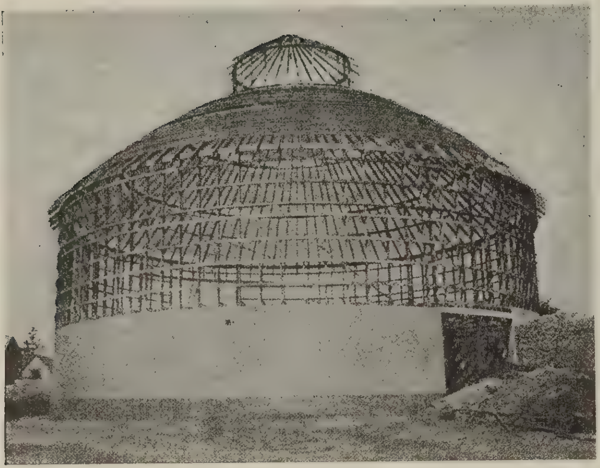


Fig. 4. This Drawing Shows Arrangement of Joists and How the Floor Is Laid

Round and Rectangular Barns Compared.

In comparing the 60-foot round barn with a rectangular barn of the same area, the two barns should afford the cows the same amount of space on the platform. Allowing each cow in the 60-foot round barn 3 feet 6 inches in width at the rear of the platform, it will accommodate 40 cows and leave space for two passageways. See Fig. 2. But in a rectangular barn, only 3 feet 4 inches of platform space need be allowed for each cow, and the 36½x 78½ foot barn, with two 3-foot passageways across it for convenience in feeding, will accommodate 42 cows. While the rectangular barn has stall room for two more cows, the round barn contains space in the center for a silo 18 feet in diameter.

The 36½ x 176¾-foot rectangular barn would

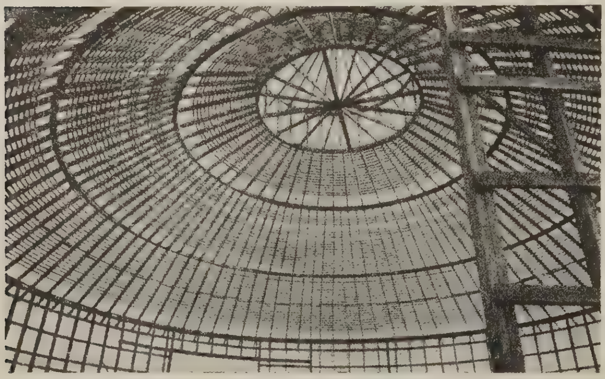


Barn 70 Feet in Diameter; Frame Hooped for Perpendicular Siding; Lower Section Sided

hold 100 cows, allowing each cow 3 feet 4 inches in width and providing for 3 passageways of 3 feet each across the barn.

The 90-foot round barn would hold 105 cows in two rows headed together, 65 of which would be in the outer circle, and have 3 feet 6 inches each in width at the gutter. See Fig. 3. This leaves sufficient room for feed alleys and walks, and two passageways, one three feet and the other seven feet wide for the manure and feed carriers. All of this is outside of a central space for a silo 20 feet in diameter and 71 feet high, with a capacity for 620 tons of silage, and in the mow there would still be an excess above the capacity of the rectangular barn, of 33,000 cubic feet, which would hold 66 tons of hay, or as much as the entire mow of a barn 32 x 36 feet with 20-foot posts.

The square feet of floor space in the round barn 90 feet in diameter and rectangular barn 36 x 176¾ feet are the same, but the cubical content of the former is more than that of the latter. The increase in the lumber bill is 23 per cent. in the plank frame and 53 per cent. in the mortise frame rectangular barn. The round barn 90 feet in diameter contains 283 and the rectangular barn 426 lineal feet of wall. The rectangular barn has, therefore, 50 per cent. more lineal feet of outside barn wall, requiring a proportional increase in both paint and foundation.



View of 70-Foot Self-Supporting Roof Framing of Barn Shown Above. Note Hoops on Studs in Right Foreground

The smaller surface on the outside wall of the round barn requires less paint and makes a proportional saving in keeping the round barn painted in after years.

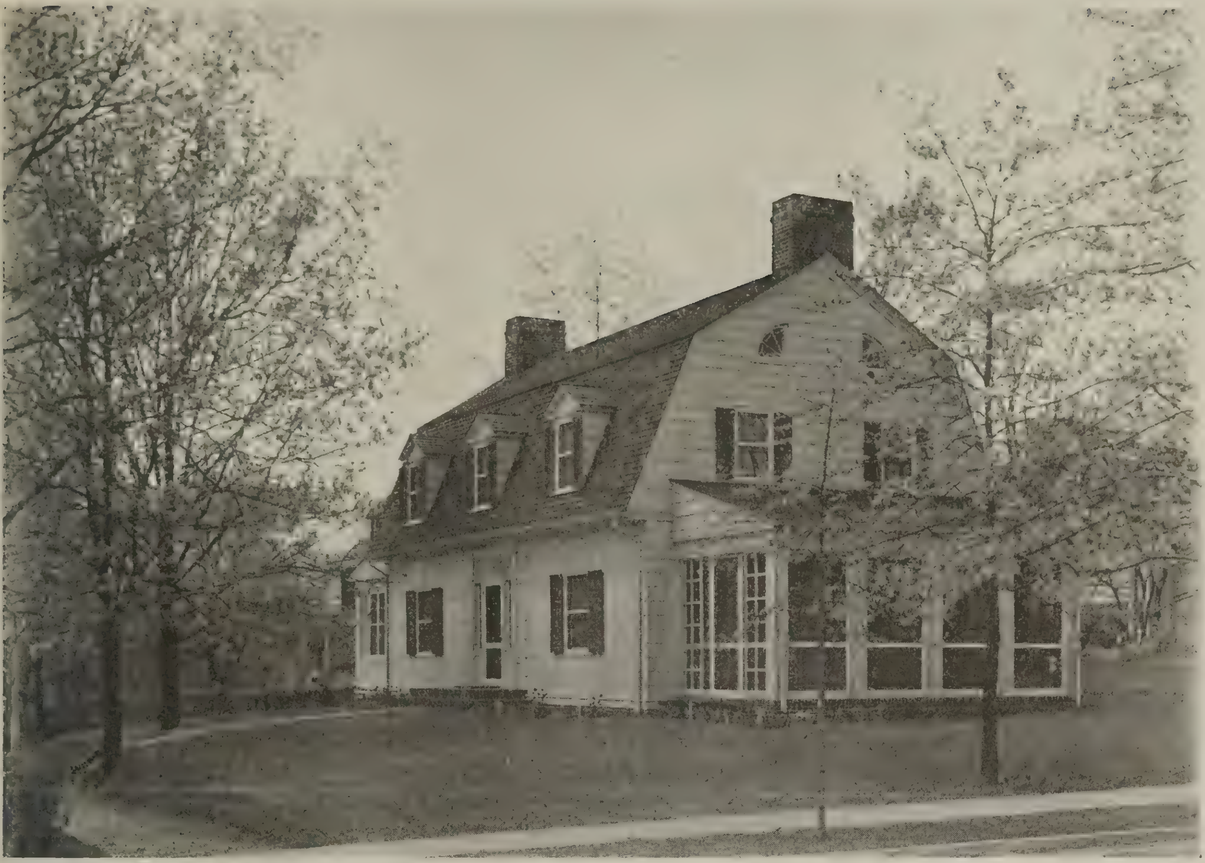
Disadvantages of the Round Dairy Barn.

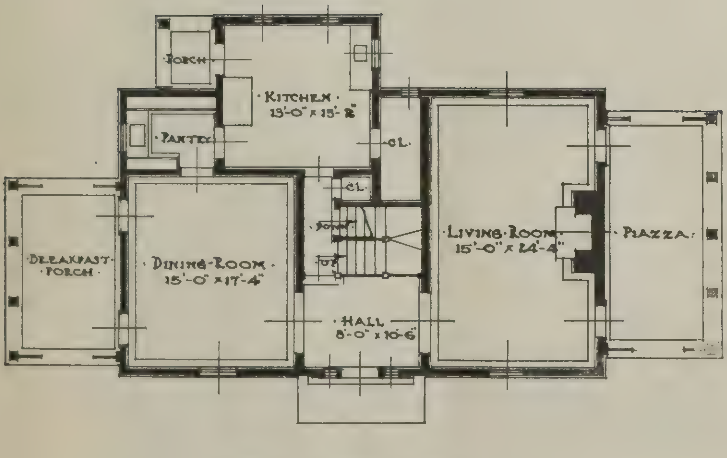
THE disadvantages of the round dairy barn are, that it cannot be enlarged by building on as readily as can the rectangular form, but as the round barn may be built higher to the eaves than a rectangular barn 36 feet wide, provision can be made for the growth of the herd by building so as to put cows in the second story and still leave sufficient mow room for hay.

The objection is frequently raised that a round barn is difficult to light. This difficulty is entirely overcome in a barn 90 feet or less in diameter, if a sufficient number of properly spaced windows are used. See Fig. 2. With the same number of windows, the light is more evenly distributed in a round barn and the sun can shine directly into some portions at all hours of the day during the winter.

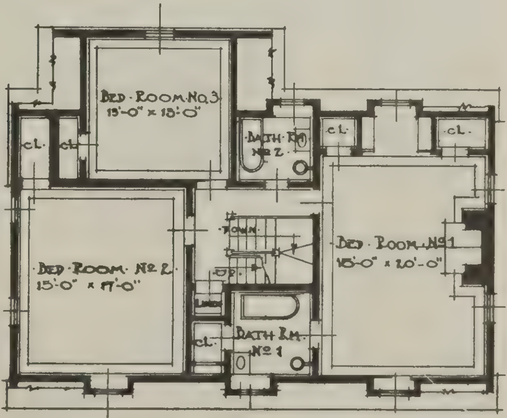
The objection has been raised that rectangular objects cannot be placed in a circle without a waste of space, but this does not apply to a dairy barn, as the storage of hay and grain depends upon cubical content alone and silos should always be circular, no matter where built. Cows, when lying down, are decidedly wedge-shaped, requiring much less space in front than behind. The objection may be raised, with round barns large enough for two rows of cows, that the row headed out does not use the space as economically as in the rectangular form, because a cow needs more width at the rear of the platform than at the manger. Where there are two rows of cows, the inner row is usually headed out, and as only about one-third of the cows are in this row this loss of space is counterbalanced by the large number of cows in the outer circle using the space more economically than they do in the rectangular barn.

Box stalls cannot be as conveniently arranged, but in a one-row barn, gates hung on the outside and swung around to the manger, form stalls for cows at freshening time, and in a barn with two rows, box stalls can be arranged in the inner circle.





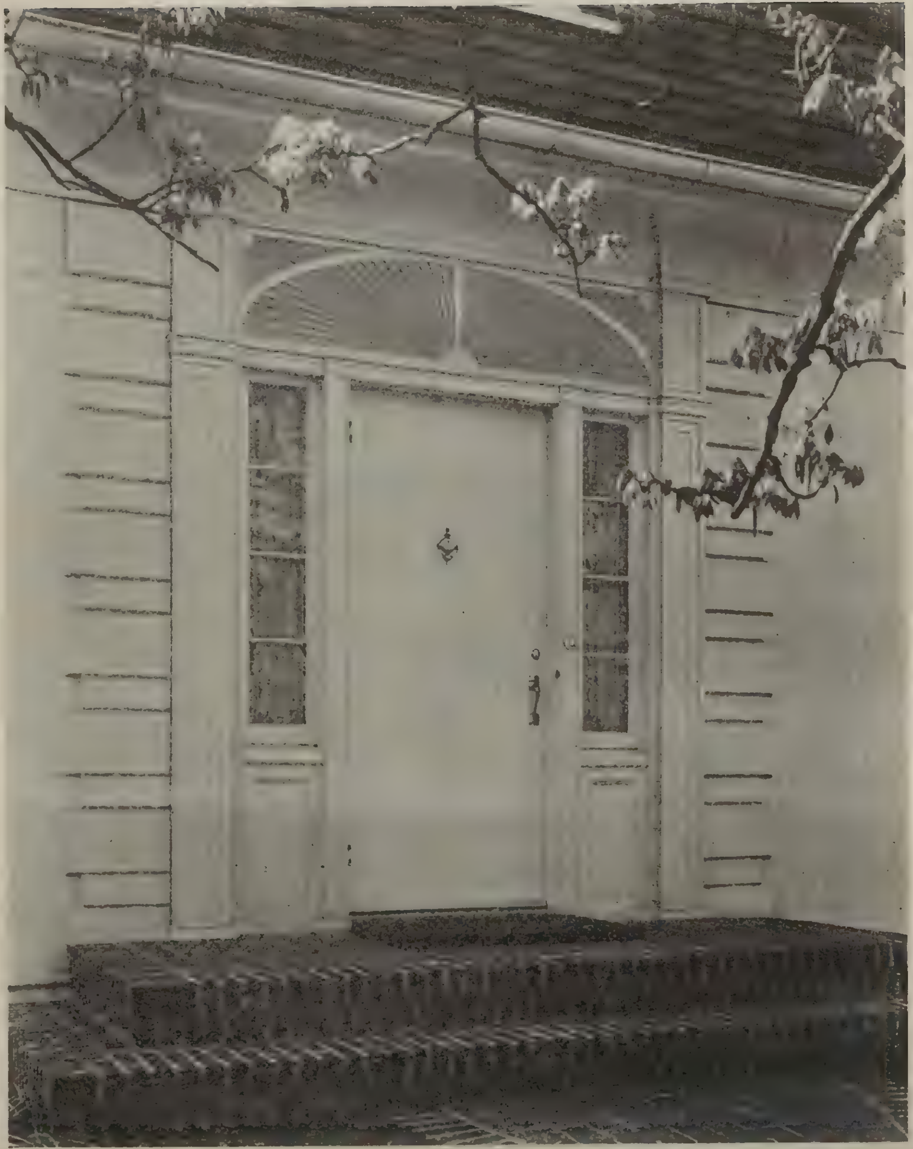
·FIRST· FLOOR· PLAN·



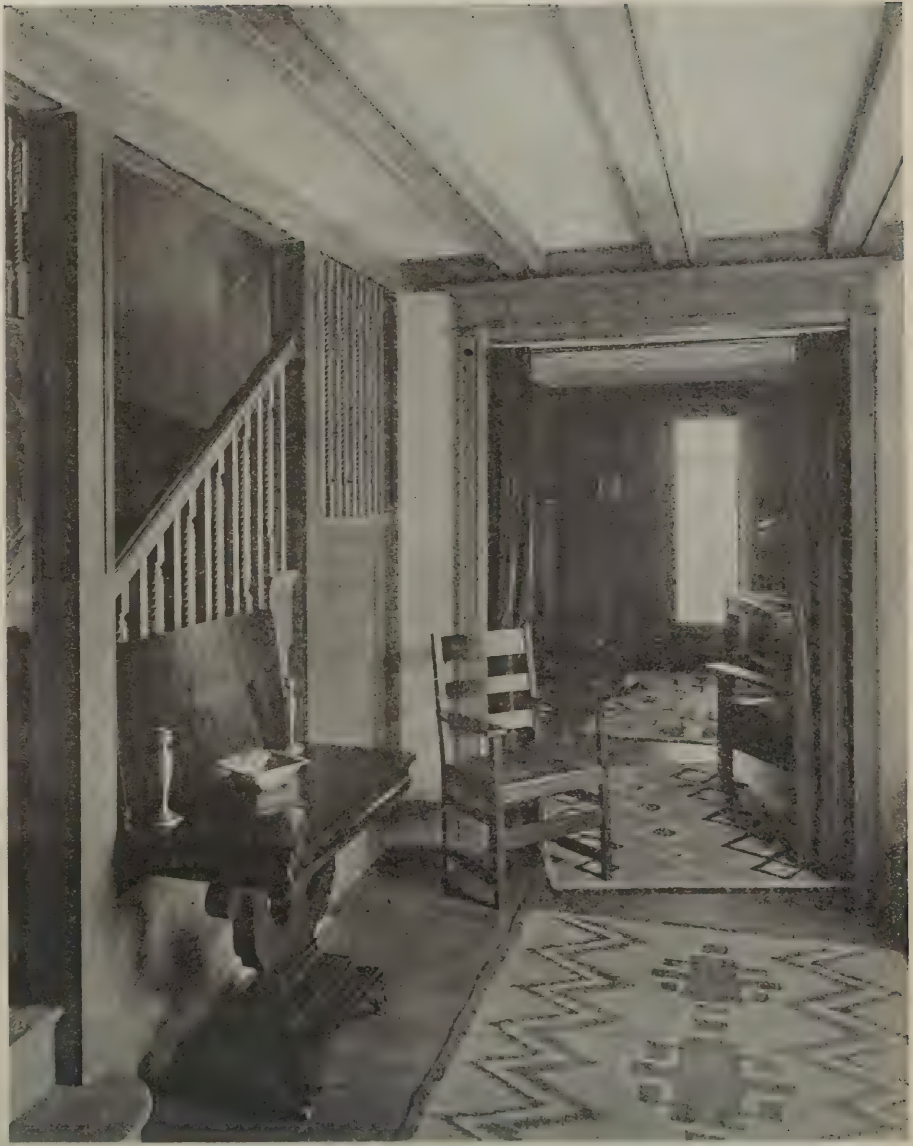
·SECOND·FLOOR·PLAN·

HOUSE OF D. W. NYE, KEW GARDENS, LONG ISLAND, N. Y.

Aymar Embury II, Architect

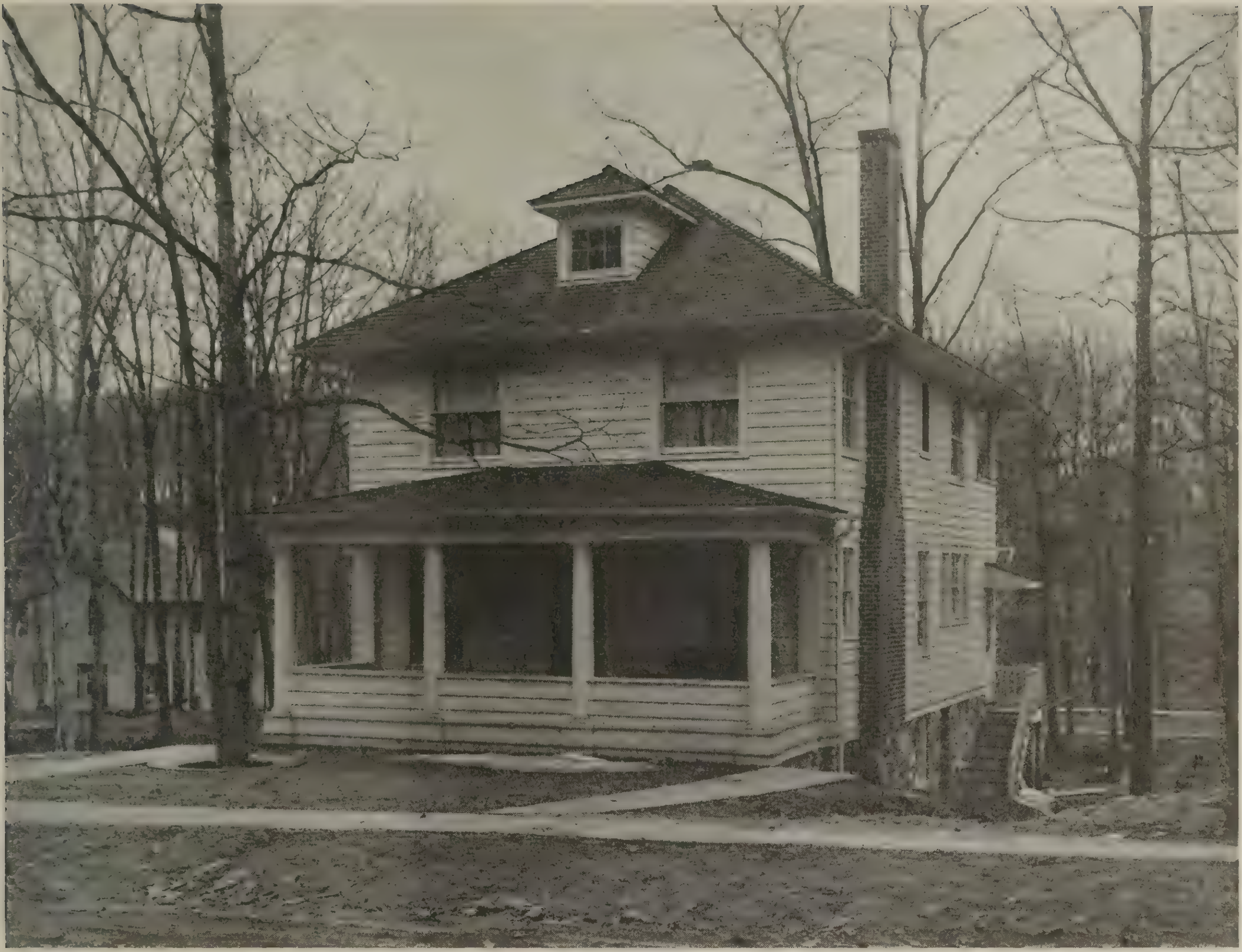


Main Entrance Detail

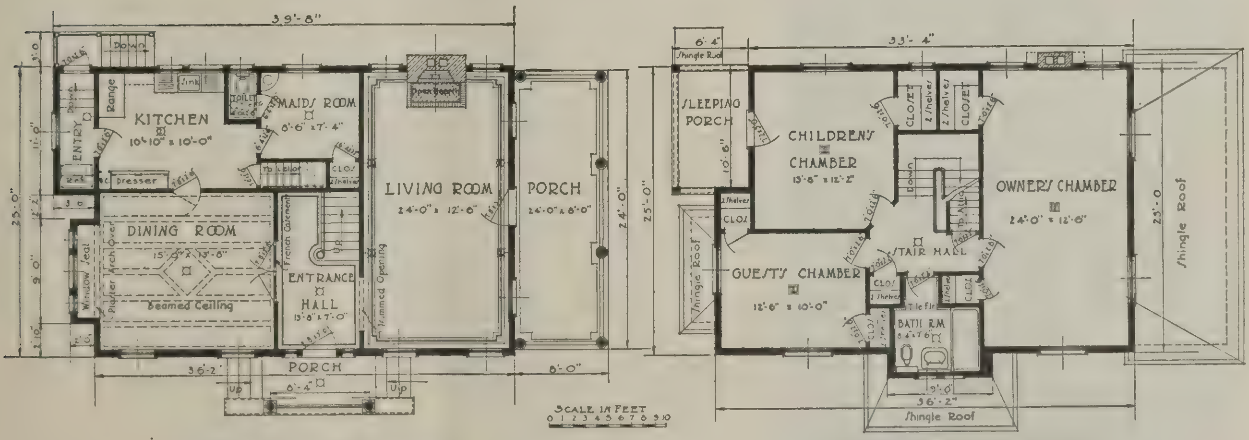


Stair Hall

HOUSE OF D. W. NYE, KEW GARDENS, LONG ISLAND, N. Y.
Aymar Embury II, Architect



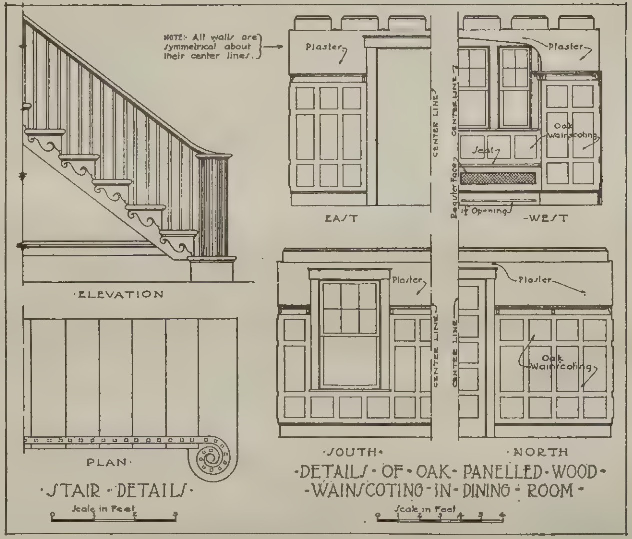
Front View
(See pages 42 and 43)



·FIRST·FLOOR·PLAN· ·SECOND·FLOOR·PLAN·

HOUSE OF P. H. DAVIS, PELHAMWOOD, N. Y.
Jacob Gescheidt & Company, Architects and Builders

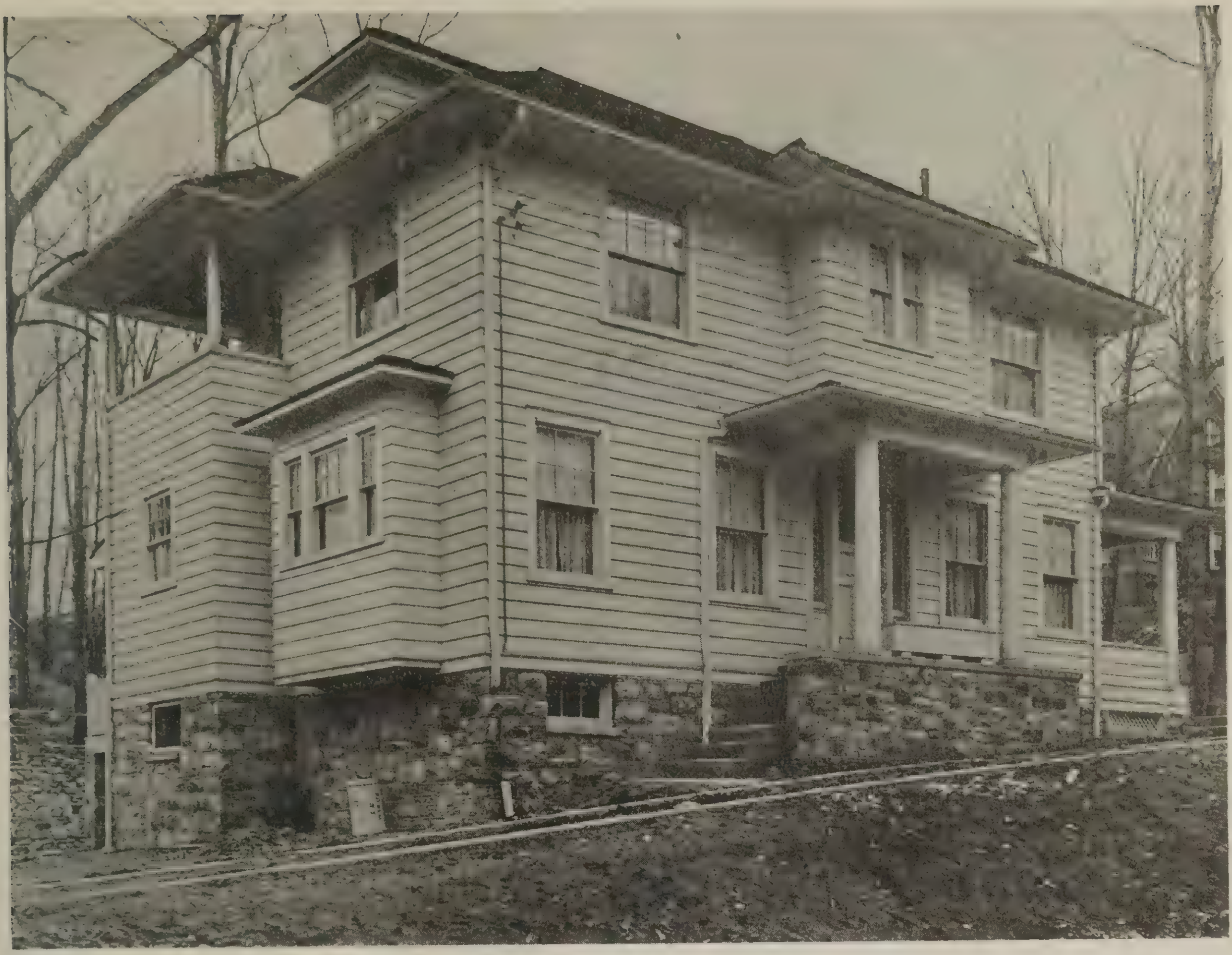
Living Room



Stairway

HOUSE OF P. H. DAVIS, PELHAMWOOD, N. Y.

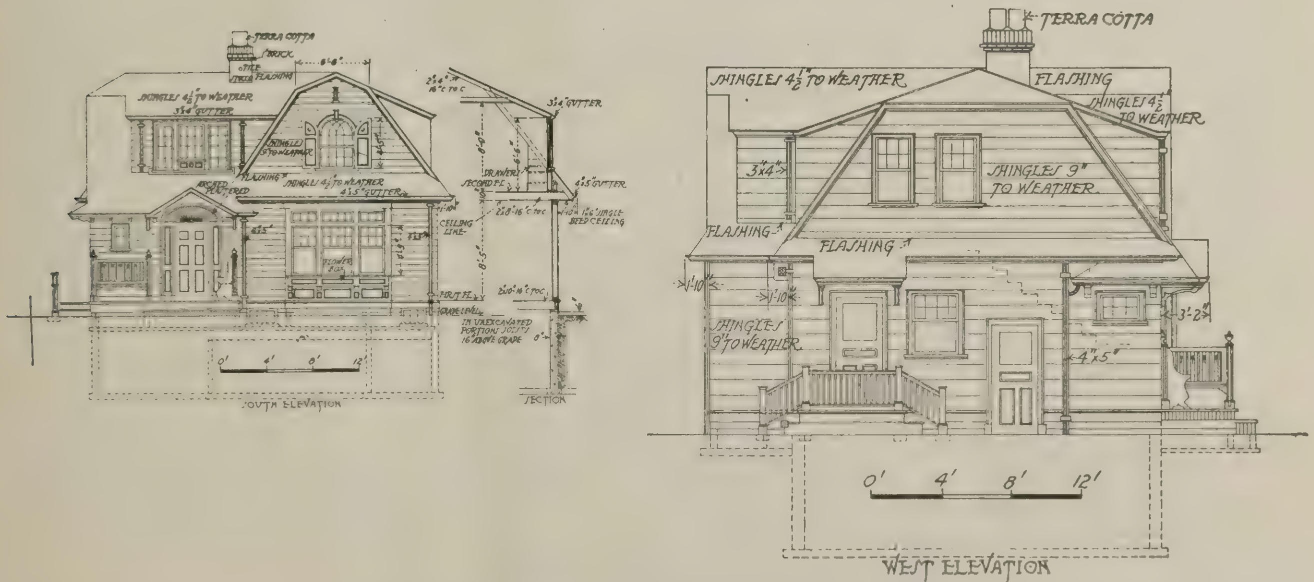
(See pages 41 and 43)



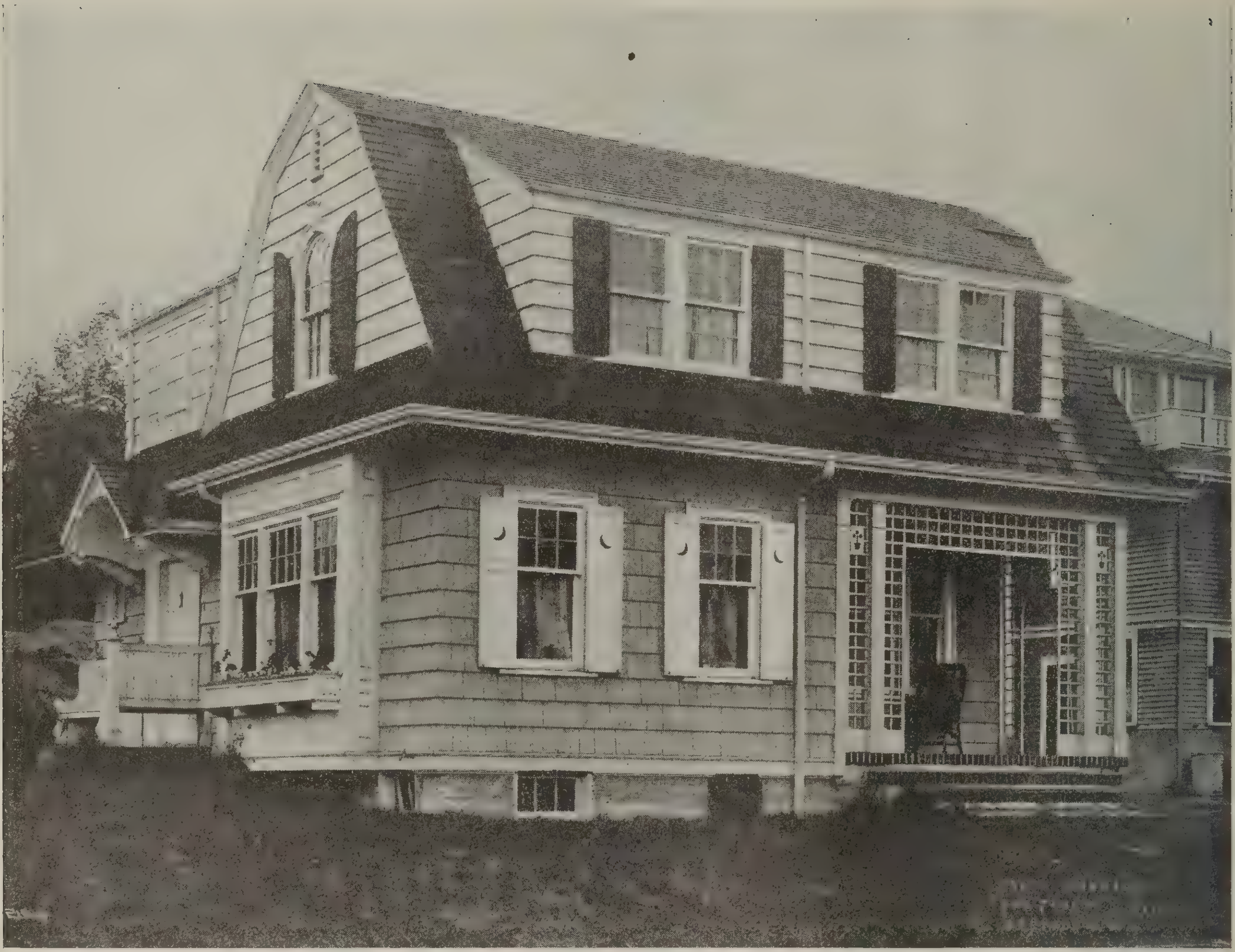
Rear View

HOUSE OF P. H. DAVIS, PELHAMWOOD, N. Y.

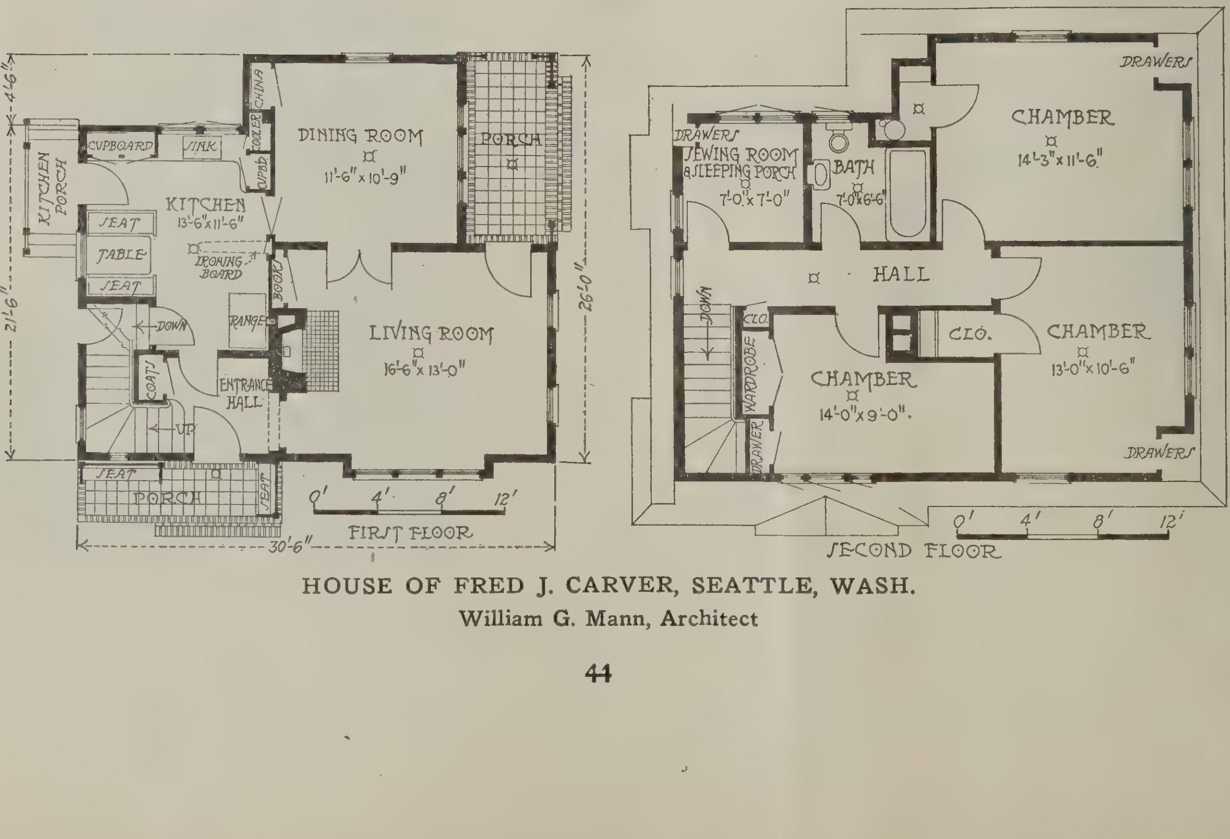
(See pages 41 and 42)



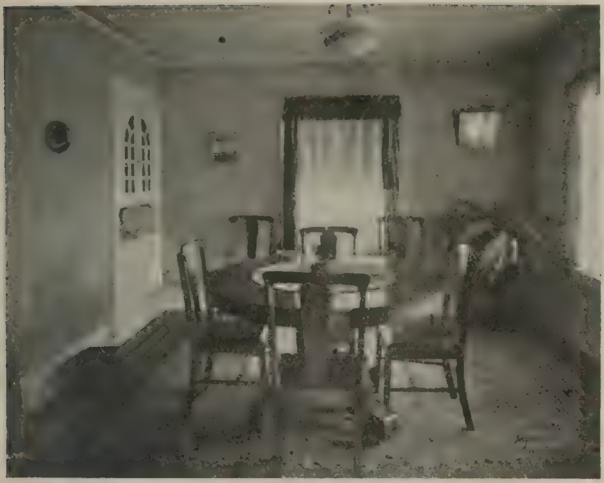
HOUSE OF FRED J. CARVER, SEATTLE, WASH.



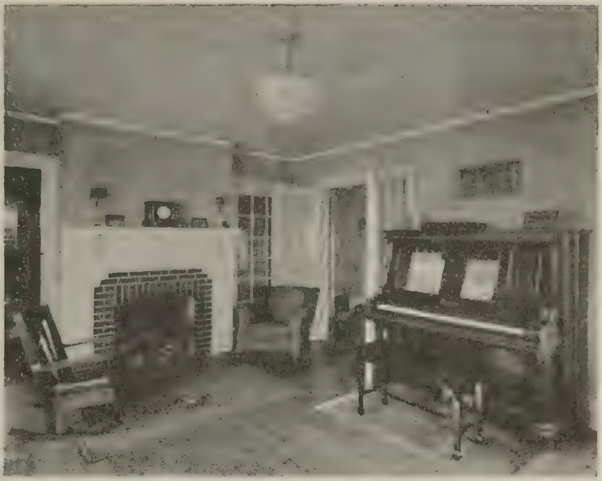
Front View
(See pages 43, 45 and 46)



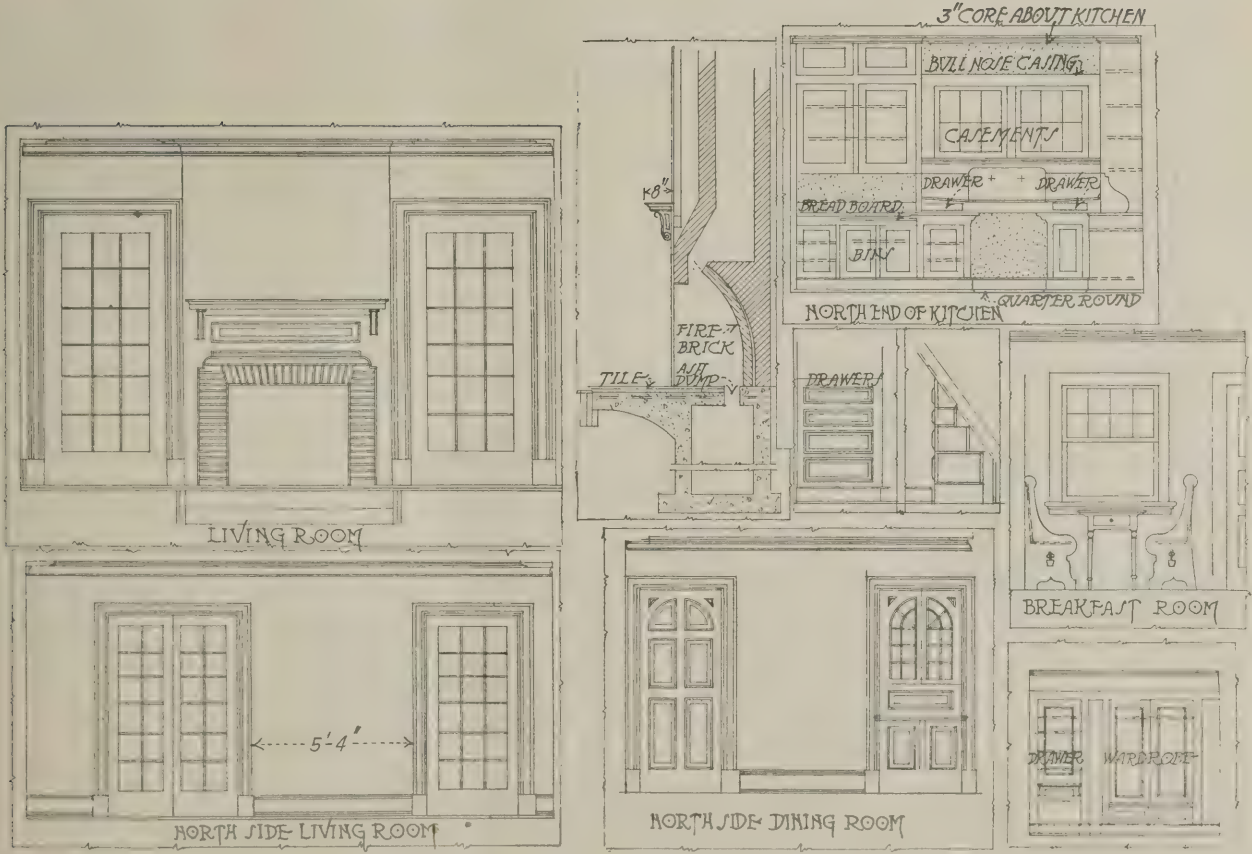
HOUSE OF FRED J. CARVER, SEATTLE, WASH.
William G. Mann, Architect



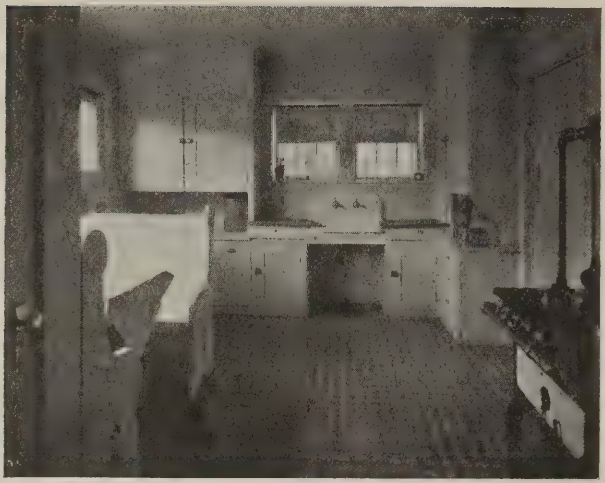
Dining Room



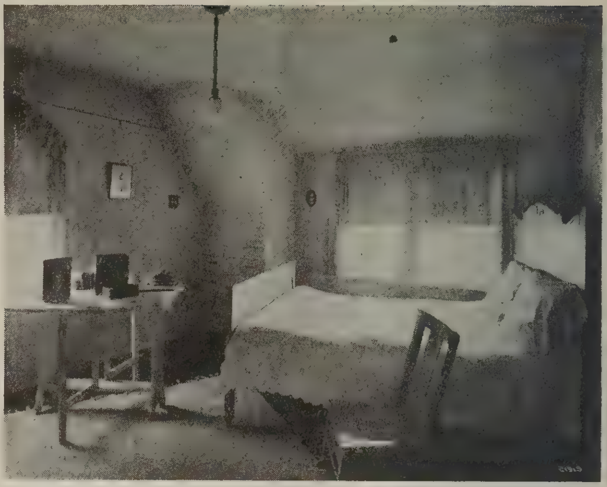
Living Room



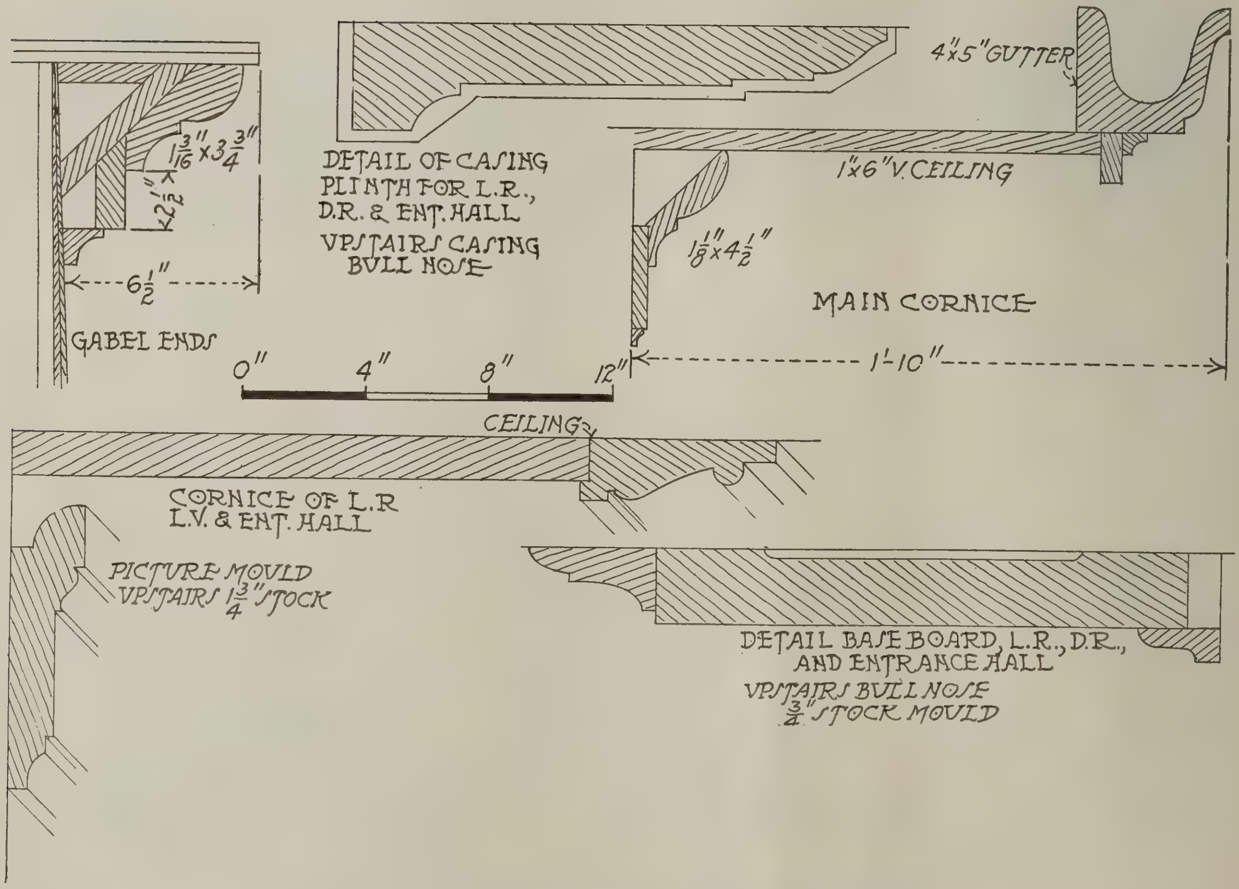
HOUSE OF FRED J. CARVER, SEATTLE, WASH.
(See pages 43, 44 and 46)



Kitchen



Bed Room


DETAIL OF CASING PLINTH FOR L.R., D.R. & ENT. HALL
UPSTAIRS CASING BULL NOSE
4"x5" GUTTER
1"x6" V. CEILING
1 3/16" x 3 3/4"
2 1/2"
6 1/2"
GABEL ENDS
1 1/8" x 4 1/2"
MAIN CORNICE
0"
4"
8"
12"
1'-10"
CEILING
CORNICE OF L.R L.V. & ENT. HALL
PICTURE MOULD UPSTAIRS 1 3/4" STOCK
DETAIL BASE BOARD, L.R., D.R., AND ENTRANCE HALL
UPSTAIRS BULL NOSE 3/4" STOCK MOULD

HOUSE OF FRED J. CARVER, SEATTLE, WASH.
(See pages 43, 44 and 45)

Editorial

Congress of the Building and Construction Industry

WE have all heard that sterling pitching wins ball games. We have also heard that heavy hitters win ball games; and there are many experts who tell us that air-tight fielding is the secret of success on the diamond. But down in our hearts we know that ball games are not won by individual stars so much as by nine quick-thinking, hard-playing men, all pulling together for one common purpose—to win that game.

In building a ship it is customary to guarantee the speed she will make. If the ship has been built to make twenty knots and makes it on her guarantee, but falls down at some later time and makes only eight knots, something is dead wrong. She needs a good inspection on the inside to find out where the trouble is.

The building industry of America numbers among its members the best architects, engineers, contractors, manufacturers, financial men, dealers and workmen in the world; and yet this industry today is in a bad slump. She was built for twenty knots and is only making eight, and we all know very well that she has the stuff in her to make more than twenty knots if all her parts are functioning properly. We in America have an international reputation for doing things bigger and better than anywhere in the world. This reputation *must* be preserved.

For this purpose the Congress of the Building and Construction Industry has been organized by the industry and for the industry. It is composed of and represented by every functioning part of the industry—the architect, engineer, contractor, manufacturer, financial man, dealer and working man. All have come together for one common purpose—determined to learn more about the big, powerful piece of machinery that gives them their bread and butter and that is temporarily out of commission, and to find out just what the matter is with this machine.

They realize that the mechanism is complex; that each working part is very much dependent on all the other parts. They are going to determine on better methods of co-operation, rebuild weak parts and find out just what is necessary to put the machine in first-class running order. They know there is a pressing need for building throughout the country. They know there are able and willing workers to handle the jobs. They know also about the difficulty of financing such work today. But they also know that the industry is big enough and rich enough to finance itself if necessary.

Matters of such nature will be discussed not only at the local meetings that are being held all over the country, but at the National Congress to be held in Chicago in the early Spring. This congress will meet not for the purpose of criticism, but for mutual help, co-operation and self-examination. Therein it differs from any organization in existence, and for that reason it deserves the whole-hearted, enthusiastic and active support of every member and individual in the industry.

For This and Every New Year

Resolved

—that I will not participate in pessimistic gossip regarding business conditions.

—that I will keep silent rather than add momentum to unfounded rumors of discouragement.

—that I will consider the problem of readjustment as a personal problem.

—that I will do the job in hand with energy and enthusiasm.

—that I will think more of the day's work than the day's pay.

—that even under the most trying conditions, I will not allow myself to lose sight of the fact that America is the greatest country in the whole world —that American Industry will always survive.

We have just received from Mr. C. M. Eason, vice-president of the Hyatt Roller Bearing Company, this copy of his resolutions for the New Year. These resolutions are so good that we have thought it worth while to print them here.

What is needed today more than anything else is less grumbling and small talk and more of the good old-fashioned work that we used to do. After all is said and done, let us not forget that there are many countries on the face of the globe that are a whole lot worse off than we are in America.

As Mr. Eason says, the problem of readjustment is a *personal* one. It is *our* problem and *your* problem, not the other man's. How rapid and successful the reconstruction period is depends on what *we* do. It means good, hard team-work, rigid economy, active optimism and sound common sense on the part of each individual. Ask yourself what are *you* doing, not what is the other fellow doing.

The Efficiency of the Motor Truck

THE builder who today refuses to avail himself of every mechanical device which will bring about increased efficiency and decreased cost in the operation of his business, is helping to keep up the high cost of building, and to that extent, is holding back the biggest building boom that this country will ever know.

Transportation of materials has a very direct bearing on the contracting business. The methods in vogue yesterday are not those of today. This is clearly illustrated in the above photograph which shows a ridiculously small load transported by a horse and cart, compared with a modern motor truck.

As previously pointed out in the columns of this paper, the efficiency of the motor truck can be very materially increased by supplementing it with one or more trailers.

Gottron Brothers of Freemont, Ohio, who handle stone and other builders' supplies, maintain their own quarries where stone is blasted out, loaded on trucks both by steam shovel and portable electric conveyer, and transported to the jobs where needed. The accompanying illustrations show how this enterprising concern handles its work. Their first service truck has now been in use for over four years, and their fourth was delivered last September. Theirs is a typical example of a material saving effected by the substitution of trucks for horses. Before the present fleet of trucks was put into operation, the maximum load that these horses and eighteen men could haul from quarry to crusher — a distance of only 200 yards—was 15 to 18 tons of rock per hour. Now one truck and six men are carrying 40 tons the same distance each hour. The real job of the trucks, however, is not this very short haul, but getting the material from the source of supply to the contractor waiting for it. In getting out of the quarry the road rises 35 feet in a distance of 200 feet, but these trucks are

Results of Test of Riker Truck with Type "FF" Fontaine Demountable Truck Body Hauling Brick from Brick Yard at Bakersville to Atlantic City, N. J., Owned by Somers Brick Company, Atlantic City, N. J.

Working days in the month		26
Truck worked including 4 one-half days Saturday		26
Number of loads, 22 week days		87
Number of loads, 4 Saturdays		8
Total number of loads during the month		95
Number of brick hauled during the month		236,600
Number of brick per load		2,491
Miles traveled		2,128
Number of miles traveled per day		88.66
Number of miles per load		22.4
Gasoline used, 475 gals. at 29½c		$140.43
Miles per gallon gasoline		4.5
Lubricating oil 12¼ gals. at 85c		$10.78
Miles per gallon oil		174
Repairs to truck		$2.30
Time lost during repairs		1 hr. 55 min.
Gasoline cost per mile	06.6	
Oil cost per mile	5	
Total cost gasoline and oil per mile		07.1
Estimated cost of tires per mile	04.0	
Estimated depreciation per mile	10.0	
		14.0
TOTAL COST PER MILE		21.1
88.66 miles per day at 21.1 ct. per mile equals cost per day		$18.70
Truck driver per day $6.35		6.35
Interest on total investment per day		.72
License, cost per day		.15
Insurance, cost per day		.80
TOTAL COST PER DAY		$26.72

Truck averaged 88.66 miles per day equals 30.14c. per mile.

Truck traveled 2128 miles during the month equals a cost of $641.37.

236,600 brick delivered on an average haul of 22.4 mile for $641.37 makes a grand total cost per thousand brick $2.71.

giving excellent service over good roads or bad, level or on steep grade.

Attention is directed to two of these trucks, heavily loaded, negotiating a stretch of fairly good level road while another illustration shows the same outfit surmounting a steep grade on which the road is in a very much worse condition. Most of the hauls vary from 1 to 15 miles. This concern estimates that its four 3½-ton trucks cover an average distance of from 85 to 100 miles each per day, working a ten-hour day, although its records show that these trucks have made as high as 106 miles each a day over a two weeks' period. The conditions under which this record was made was a long haul and only four round trips per day, delivering stone to a job a trifle over 13 miles from the quarry.

Taking a Steep Grade
Motor trucks make heavy loads possible

The Same Trucks Nearing the Top
The heavy truck is holding its own

The motor truck can always be put to good use. The contractor who is not sufficiently busy to keep his trucks in constant operation on his building work, can often hire them out at a very good figure, or he may be able to pick up contracts on filling in swamp land, etc.

In the case of the trucks here mentioned, the total maintenance expense (exclusive of gasoline, oil and driver), covering a period of four years, has been less than $700 and this included two re-paintings. All but the last truck received a general overhauling last winter when work was slack. In this service the motor truck has been economical and reliable.

Loading a Motor Truck at the Quarry
The portable loader saves money in time and labor

Securing a Dry Cellar*

By *George M. Warren*

Hydraulic Engineer, Bureau of Public Roads

Part III

SOME of the preparations used in the integral method of waterproofing depend on the void-filling action of their finely divided particles, but others naturally repel water in the same manner that neat's foot oil turns water from a boot. Some of the preparations in the form of a whitish powder are mixed dry with the cement, and others in paste or liquid form are added to the water. The investigations of the Bureau of Public Roads have shown that petroleum residuum possessing certain characteristics (the specifications allow paraffin base and mixed base oils but do not allow highly asphaltic oils) can be used successfully for both damp-proofing and waterproofing under light pressures, and the subject is concisely treated in Department Bulletin 230, "Oil-Mixed Portland Cement Concrete," copies of which may be had upon request.

Sources of Difficulties

Probably no one knows which of the many preparations is the best. With the successes are many failures, caused in part by inherent weakness of the method and in part by faulty workmanship in mixing and placing the concrete. Much of the trouble comes at construction joints and at cracks caused by settlement, shrinkage, temperature changes, and other agencies. At these points integral waterproofing fails. But where, as so frequently happens, a lean, raw concrete is carelessly placed, perhaps in the expectation that water under pressure from beneath or the back can be "smothered," failure is certain, nor can such failures be attributed to the integral method.

The fact needs to be strongly impressed that no waterproofing preparation can make amends for a concrete that is not dense and uniform throughout; that is, honeycombed or containing pockets of stone, sand, water, or air. Concrete to be dense and impervious requires first-class materials and workmanship, and in so far as these are employed the need of special waterproofing mixtures and compounds is lessened. Indeed, assuming that cement, sand, and stone are so graded and combined with water as to produce a concrete of maximum density, the principal effect of certain substances used for waterproofing may be mere increase of the volume, an effect that would be produced by introducing almost any foreign substance.

The following directions will be found of great practical value in building water-tight concrete floors and walls.

Start the work in mild weather and during the dryest season of the year, when the ground water is the lowest. If necessary in order to eliminate all hydrostatic pressure against newly placed concrete, a sump or hole must be sunk at one corner of the cellar excavation and the ground water be lowered by pumping.

Select Materials Carefully

Use a recent shipment of Portland cement of established reputation.

Use clean sand—that is, such as contains little or no clay, silt, loam, or vegetable matter. Where bank, pit, beach, or river-bottom sand is not available, a suitable sand is often obtained by use of a gravel screen. The best type of screen has longitudinal wires spaced about ¼ inch on centers, with horizontal wires 4 to 6 inches apart to act as stiffeners. If such a screen is not available the ordinary ¼-inch square mesh will answer. The size of the sand grains should grade from coarse (say ⅛ inch) to very fine, but with a goodly proportion of fine.

Use clean screened gravel or broken stone, the pieces varying from ¼ to 1¼ inches in diameter. Screened gravel is preferable to broken stone, as from its rounded nature it is more workable and is more easily settled into place in the forms. As to the maximum size of the stone, the practices followed in building concrete standpipes, barges, and ships, all thin-walled structures where water-tightness is vital, are illuminating. In these works the practice has been to use small-size stone and very rich mixtures.

Emergency Fleet Specifications

For example, the Emergency Fleet Corporation used, as the stone constituent, ⅜-inch washed gravel mixed with 50 per cent. coarse washed grit, the concrete being proportioned 1 volume cement, 2/3 volume sand, and 1 1/3 volumes of the mixed gravel. In other vessels a burnt shale-clay crushed to ¼ and ½ inch sizes proved acceptable and, furthermore, when used in proportions to give a 1:2 concrete (1 of cement to 2 of sand and gravel combined) resulted in a product weighing 118 pounds or less per cubic foot instead of the usual weight of about 150 pounds. In barge construction, broken stone sizing up to ⅝-inch diameter and mixed in the proportions 1 :1 :2 has given satisfaction. In standpipe construction use of somewhat larger stone has usually been permitted, but invariably the mix has been rich, say, 1 :1 :2 or 1 :1½ :3. Never use bank-run gravel, as the proportions of sand and gravel are unknown.

Having at hand good cement, clean water, clean sand that grades from very fine to ⅛ inch, and clean gravel that grades from ¼ to 1¼ inches, the work of mixing and placing the concrete may be begun. Hand mixing is customary on small jobs. For this purpose a level, practically water-tight platform or mixing board, and two bottomless boxes or frames for measurement of the sand and gravel are necessary. Concrete, proportioned 1 volume cement, 2 volumes sand, and 3 volumes stone (usually written 1 :2 :3) is recommended. Though this is not as rich as is used in the ship work previously mentioned, it provides an abundance of good mortar, something that is vital in the elimination of void spaces and in securing water-tightness. If the concrete is to be mixed in half-barrel (2 bags) batches, a suitable size of platform is 10 feet square. There should be sufficient supporting pieces or battens to prevent sag of the boards, and a strip may be nailed along the outside edges to prevent loss of liquid cement.

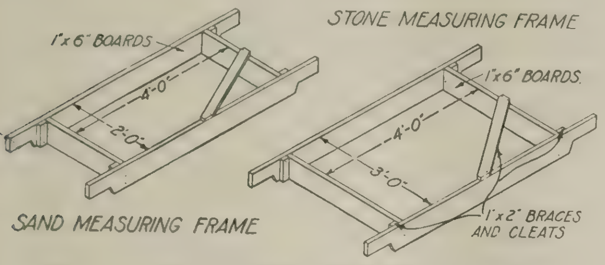


Fig. 18. Sand and Stone Measuring Frames or Bottomless Boxes

The dimensions shown are for half-barrel (2-bag) batches mixed in the proportions 1: 2: 3 (1 volume cement, 2 volumes sand, 3 volumes stone).

Obtaining Correct Proportions

A half-barrel of cement contains approximately 2 cubic feet. Hence, to obtaining the proportions 1 :2 :3, the sand and stone measuring frames must contain, respectively, 4 cubic feet and 6 cubic feet. Square-edge boards 1 inch thick and 6 inches wide may be used conveniently for making the frames as dimensioned in figure 18. Never guess at the proper quantities of cement, sand, and stone, and never use the inaccurate method of measuring by shovelfuls or by wheelbarrow loads.

Place the two frames with their long sides parallel and about 2 feet apart on the platform. Fill the smaller frame with sand the larger with stone previously drenched, both level full. Lift off both frames. Empty the half barrel or two bags of cement over the sand and spread it evenly with a garden rake or mortar hoe. Thoroughly mix the dry sand and cement. Starting at opposite ends of the pile and working toward each other, two men with square-end shovels should turn the sand and cement from the bottom upward. In turning the shovel the materials should be shaken off the end and sides of the shovel so that they mix in falling. Continue this process till the mixture is of uniform color throughout. Mound the mixture slightly and with a mortar hoe make a craterlike opening in the top. Add water and stir with a mortar hoe until a soft, plastic, uniformly mixed mortar is obtained. Spread the mortar evenly over the wet stone. With square-end shovels turn the stone and mortar in much the same manner as the cement and sand were turned, except that instead of shaking the mixture off the shovel the whole shovel load should be turned over the side with a backward sweeping motion toward the shoveler. The mass should be turned back and be returned, adding small quantities of water as may be needed until every stone appears to be well coated with mortar and the whole mass is uniformly mixed throughout. The mixing can not be slighted.

Amount of Water is Important

The water used in mixing gives concrete its consistency and makes it workable. The quantity used has a very important bearing on the water-tightness of the finished work. If the mix is too dry the concrete will be porous and ragged; if too wet the gluelike action of the cement is weakened and the mortar and stones tend to separate, leaving stone pockets through the mass and causing poor distribution of the cementing or bonding constituent. For example, an excess of paste (cement and water) on the top of newly-placed concrete means that some adjacent portion of the mass is just that much poorer in its bonding constituent. What is wanted is a consistency that will permit a sluggish flow to all parts of the form and when the concrete has been settled by a reasonable amount of spading and tamping there should be a small even flush over the entire surface.

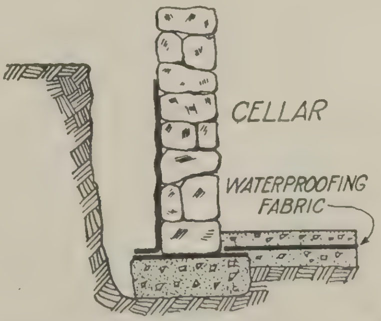


Fig. 19. Faulty Application of the Membrane Method of Waterproofing

The surface to which the fabric is applied is too rough, the wall waterproofing is unprotected, nor is it carried sufficiently high to exclude surface drainage, the single-bond joints between the wall and floor waterproofing should not be the sole dependence, and more working space should be provided in which to make this vital connection.

If it is desired to mix barrel, or 4-bag, batches make the platform larger and double the capacity of the sand and stone-measuring frames, or use those shown in figure 18 twice. For 1 cubic yard of rammed concrete there will be required about 1 2/3 barrels of cement, ½ cubic yard of sand, and ¾ of a cubic yard of stone. The volume of rammed concrete from 1 barrel (4 cubic feet) of cement, 8 cubic feet of sand, and 12 cubic feet of stone (40 per cent. voids) will be about 16.2 cubic feet.

As soon as mixed, pour the concrete and continue the operations without stopping till all work below the water line is completed. During the pouring the forms should be tapped constantly with wooden mallets to release air bubbles. At corners and against the faces of forms special care is required. Working a spade or flattened shovel up and down along the forms pushes the stone back slightly and allows the grout (liquid cement) to flow against the face, leaving the surface smooth. In narrow places a piece of 2 by 3 inch scantling, with the upper portion rounded so that it may be grasped readily, makes a cheap and useful tool for puddling, joggling, or tamping. Do not ram or tamp so much that the stones are wedged together at the bottom and much of the finer material is forced to the top. If possible pour at one time all of the concrete necessary to fill the form, so that no portion sets before fresh concrete has been laid on top of it. Where new work joins old work, and in joints between two days' work, the bond requires especial attention. The old surface must be cleaned of all dirt and mortar down to the stone, and the surface soaked with water. Smooth surfaces must be roughened. The joint should then be given a one-eighth-inch coating of neat cement paste and the new concrete be placed immediately.

After concrete has been placed it always should be protected from sunlight, frost, strong winds and excessive heat, any of which would rob it of its moisture. It is equally important that it be not exposed to water in motion or under pressure till it has hardened sufficiently to prevent washing away the mortar. After concrete is sufficiently firm to remove the forms, keep it wet continually for 10 days or more. This means thorough saturation or submergence, not an occasional sprinkling.

On the left: A, Footing course with chamfered groove formed in top to insure bonding. B, Thin wall of brick or concrete to which the saturated felt, burlap, cotton drilling or other fabric is cemented with hot coal-tar pitch, asphaltum, other suitable bituminous compound; brick walls should have struck joints and concrete walls should be smooth, thus providing a solid, even backing for the waterproofing. C, One-inch bed of cement mortar or a thin bed of concrete, according to the nature of the conditions. D, Two or more layers or sheets of waterproofing, according to the severity of the conditions; under high heads of water two courses of two layers each breaking joints as shown in Fig. 21 are employed frequently. E, Key completed with brick or stone thickly bedded in cement mortar. F, Brick, concrete, or stone wall built against the waterproofing; all space between the wall and waterproofing to be filled with cement mortar or be flushed wtih Portland cement grout. G, Four-inch concrete floor laid directly on the waterproofed fabric.

On the right: Method of interlapping and interlocking courses where it is not possible to waterproof the floor and wall at the same time. This gives a much more dependable bond than that shown in Fig. 19. H, Footing waterproofing carried 6 inches up the wall. K, Six inches of second course laid dry, thus permitting interlapping and interlocking with the floor waterproofing when latter is laid. L, Three-fourths inch protective coat of lean cement mortar on a "water" sheet, both extending over the dry lap; this coat is temporary and is removed when the floor waterproofing is laid, but it should be placed promptly so as to keep the fabric from being injured by wheelbarrows, tools, or careless workmen.

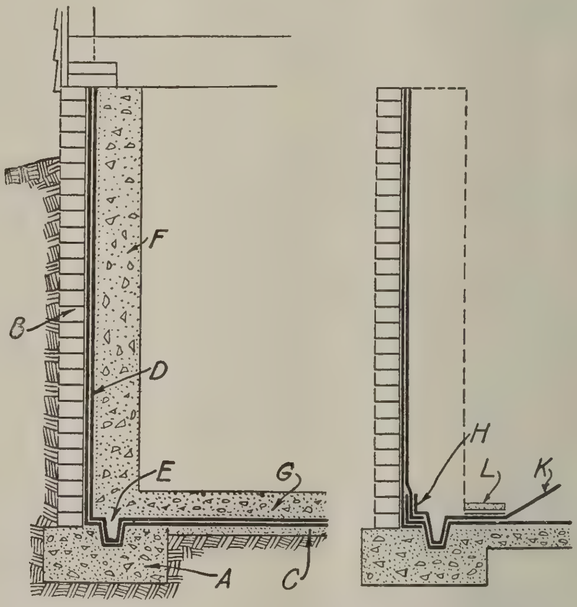


Fig. 20. Correct Application of the Membrane Method of Waterproofing

The upward water pressure on concrete floors must be considered and a sufficient amount of steel reinforcement in the form of rods, bars, heavy wire netting, or old rails be embedded to resist upheaval.

Plaster coats on old work rarely are successful because of poor bonding, scaling off, and formation of contraction cracks. Such work should be done when the concrete is green, and skilled workmen should be employed. Plastering the back of a wall is more effective than plastering the face. In any event before attempting to apply a plaster coat the old work should be scrubbed clean and should be made thoroughly wet. The bond between the old and new work will be improved if the old surface be roughened with a stone hammer. A wash composed of 1 part of hydrochloric acid and 5 parts of water may be used to clean the surface. This will dissolve some of the cement from the old work, leaving the aggregate exposed. The acid solution should be left on not longer than half an hour, when it should be removed completely with clean water. The surface then should be brushed with a wire or stiff scrubbing brush to remove any particles of sand that may have become loosened because of the dissolving of the cement.

To strengthen the bond it will be well to apply a wash of grout, made by mixing cement with water to the consistency of cream. All large holes or openings must be filled with cement mortar. A plaster coat composed of 1 part of Portland cement and 1 or 2 parts of sand may then be applied. Oil or other waterproofing compound may be incorporated with the mortar, and if applied in two coats to a total thickness of 1 inch and both coats thoroughly troweled, the results may be fairly satisfactory. The new surface should be kept wet for at least a week. Leaks at pin holes are sometimes stopped by the use of wooden plugs or caulking with lead wool.

THE MEMBRANE SYSTEM

The membrane system of waterproofing—that is, the building of a virtually water-tight box composed of overlapping and coated strips of felt or other fabric, is a reliable method if the work is done by experienced persons. Disadvantages of the method are that it is costly and if leaks do develop they are difficult to locate and costly to repair. Figure 19 shows a faulty application of the membrane method. The surface to which the membrane is applied should be smooth, the membrane should be protected, and dependence should not be placed on the single bonding shown on either side of the base of the cellar wall. Figure 20 shows a correct application of this method. For small heads of water, 2-layer work should prove effective. Figure 21 shows the details of good spacing and overlapping.

The work always should be done in warm or mild weather. Spread over the excavation a thin bed of concrete or an inch or more of cement mortar. Over this bed swab a coating of hot waterproofing compound. Closely following the swab a prepared felt or fabric is rolled into the hot compound. The sheets must lie perfectly smooth. Wrinkles must be pulled out and the sheets be rubbed and pressed to insure elimination of air bubbles and good adhesion with the compound. The membrane must fit all corners snugly. The laps of the several layers must be cemented together firmly with the hot compound and each layer, including the final, be coated completely, to the end that a strong, thoroughly covered, waterproof blanket may be obtained. The compound always should be applied hot, but care must be used not to overheat it. This is especially true of coal-tar pitch, which has a high percentage of volatile constituents and if overheated becomes brittle and worthless when cold. The membrane should be carried up the interior face of a thin protecting wall of brick, concrete, or stone, after which a wall is built against the waterproofing, the whole constituting the foundation wall.

Where it is impossible to secure local labor that is experienced in cutting and applying membrane waterproofing, get sketches, specifications, and explicit directions from a reliable manufacturer whose materials are to be used. It is advisable to try the materials first on a small upright surface before attempting the real waterproofing work. With either the integral or the membrane method of waterproofing all pipes passing through floors and walls should be provided with flanges or have other special treatment.

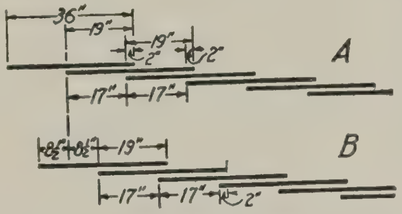


Fig. 21. Membrane Waterproofing.

A, One course of two 36-inch sheets spaced 17 inches and overlapped 19 inches. B, If two courses are laid the sheets of the second should break joints with the first in the manner shown.

In particular situations none of the remedies heretofore described may be feasible. Where water must be pumped from a cellar a variety of simple mechanical devices are available. Generally, these are placed in a pit sunk in one corner of the cellar and are operated by steam or water pressure. At best, they are makeshifts. In other instances a cellar drain may be subject to backwater from a creek. This difficulty may be overcome by use of a backwater trap, of which several types are manufactured. The essential principle is that of a swinging gate or flap hung so as to close against external pressure and to open when the height of the water inside exceeds the height of that outside.

CELLAR WINDOWS SHOULD BE AMPLE

Cellars should be provided with ample window space protected by screens or narrowly-spaced bars. Adjust the window opening in much the same manner that you would in a room. When the air outside is cool and dry, open the cellar windows freely. When the air is hot or humid close the windows. Admission of warm, moist air results in mildew and condensation of moisture upon the colder surfaces within the cellar.

In some instances dryness of a cellar is promoted by artificial heat and by use of certain substances that possess a strong affinity for moisture. Of these substances, perhaps calcium chloride is the best, and it is said that 1 or 2 pounds placed in an old can or kettle on the cellar bottom is a great aid in abating the dampness of an ordinary cellar.

The End

How to Make a Card Catalog Case

By Charles A. King.

THE case and drawers described here require no special metal fittings as the construction of the drawer permits the traveller block to be adjusted by one hand, and holds it firmly where it is placed; this brings it within the range of the job shop and the home worker.

The first step in making the case is to select the stock for the top a, bottom b, ends c, and back d of Fig. 1. Probably all but the back of the case will have to be glued, as boards of the required width can rarely be found, and if glued will hold their shape better. Make the top, bottom and ends of the required size and rabbet the inside corner of the back edge of the ends to receive the back as at e. Cut the partitions f, g, and h, and fit together as indicated at 2, their exact size being determined by the width of the ends; make an accurate notch at j of each end of the partition f. The middle standard k should be cut to exact size, and the notch made to receive the partition f at 1, and in the partition to receive the standard k, using care that the cuts in the face edge of f fits the width of the standard k closely. Cut the grooves in the ends to receive the partitions f and g, making them a strong ¼ in. deep. Do not cut through to the front but leave the wood to fit the notch i in the ends of f. Make mortises in the back as at n to support the ends of the partitions g and h; these mortises should be about ¼ in. deeper than required to allow for the shrinking and swelling of the sides and the top and bottom of the case; do not glue the partitions g and h excepting at the front for the same reason.

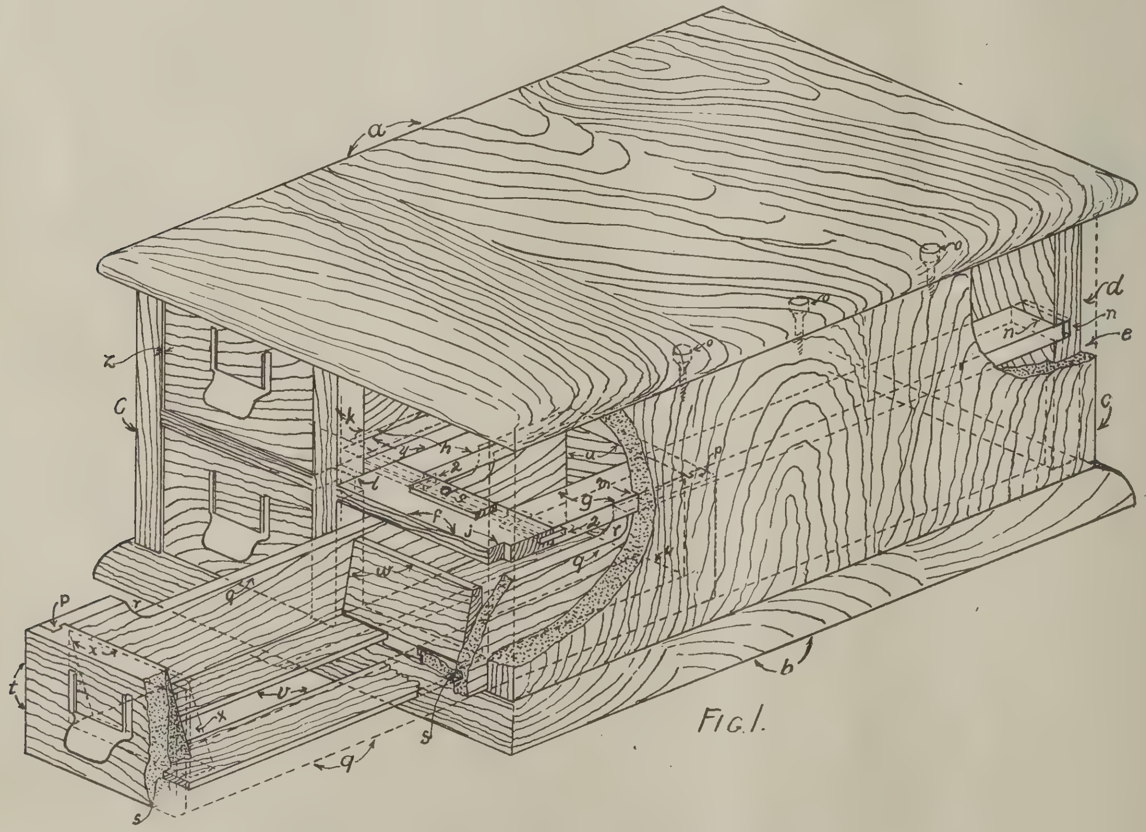
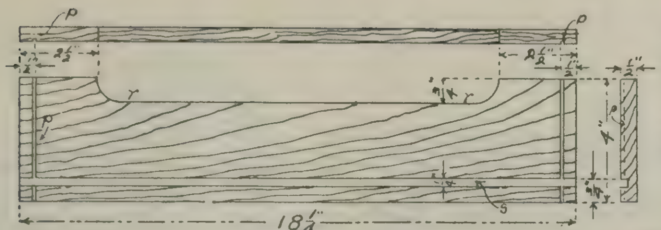
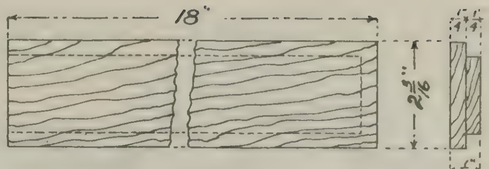


Fig. 1.

Isometric Sketch Showing Assembly of the Case



Drawer Sides q
Fig. 2



Drawer Bottoms v
Fig. 3

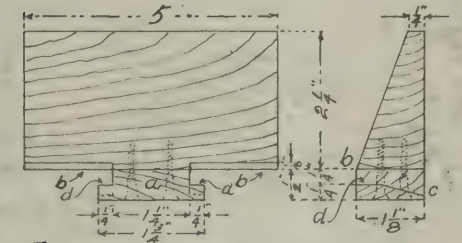


Fig. 4 Traveller Block w

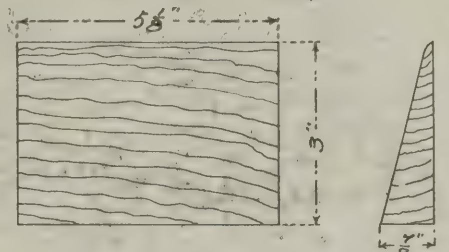


Fig. 5 Front Block x

Fasten the case together with 1½ in.-10 screws through the top and bottom into the ends and back; those in the bottom may be simply counter-sunk to make the heads flush, but those in the top must be plugged as shown at o. In doing this a ½ in. hole is bored ⅜ in. deep into the top with a smooth cutting bit and the screw hole bored through the rest of the top. After the top is screwed on, the ½ in. hole is filled with a plug to cover the head of the screw; plugs for this purpose must not be cut from a piece of wood in which the grain runs the same as in a lead pencil, as end wood would show in the top of the case. If the grain and color of the wood are carefully matched it can be seen only by close scrutiny.

The drawers may be dovetailed, or halved and nailed, or milled as shown at p, Fig. 1 and 2, and nailed. The top edge of the drawer sides q are recessed as at r to allow the cards to be manipulated more easily. The grooves s in the bottom of the inside of the drawer front t must coincide with those of the drawer sides q, while the bottom of the back u of Fig. 1 must be flush with the top of the grooves s of the sides. The drawer bottom v, Figs. 1 and 3 should be fitted to leave a space 1¼ inches wide between them when they are in place; they should be glued into the groove s of the front and nailed into the bottom edge of the back u.

The guide a of traveller block w of Figs. 1 and 4 slide in this space; the bottom of w should be bevelled as indicated at b and the guide a bevelled as at c, of Fig. 4, to permit the block to be tipped forward, thus releasing the grip so the guide may be moved easily back and forth in the space between the drawer bottoms v. When the traveller block is resting in its place with its back at right angles with the drawer bottom, the cards will rest at a slant which will permit them to be read easily. If the block should slip a small piece of sandpaper glued on d of the guide a will remedy the trouble. The front block x should be glued and nailed against the inside of the front as at x of Fig. 1.

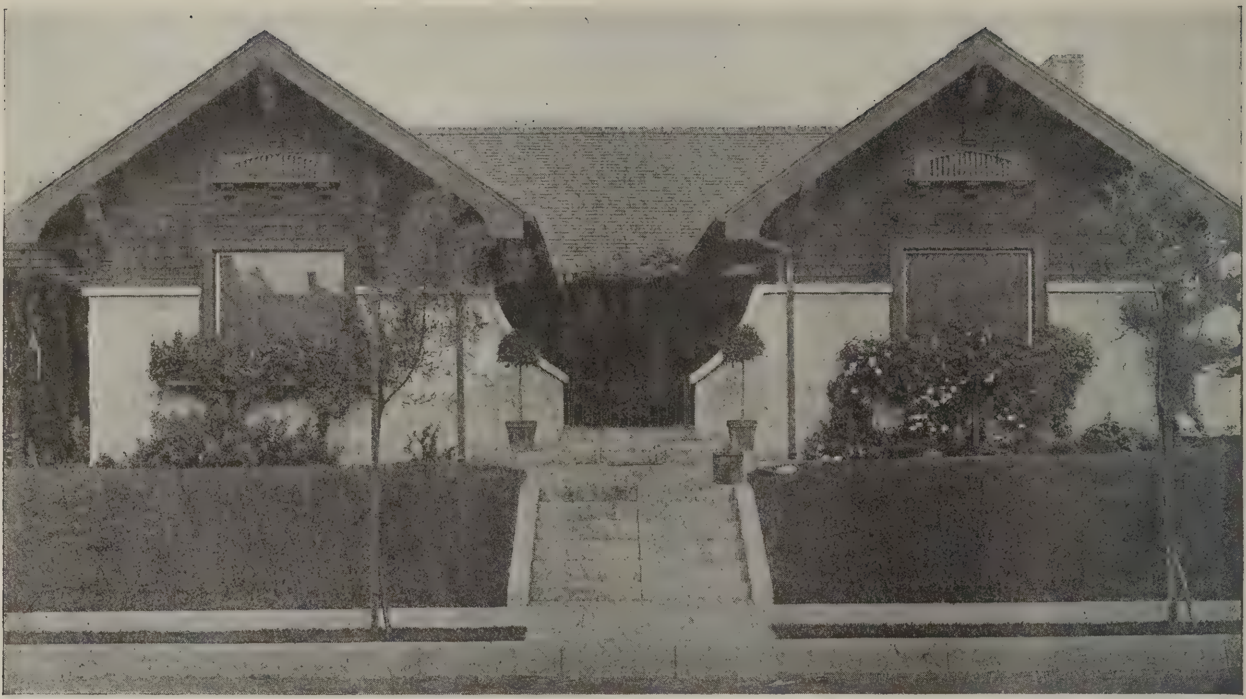
Fit the drawers and number them so they may always be put in the same place. With a pencil, make a mark upon the partitions h along the entire length of each drawer side and fit the run y between these marks and nail it. Do not make the mistake of running the drawers loosely, for the snug fitting drawer runs more easily. When the drawers are in their places their fronts should not be flush with the front of the case, but set back a strong 1/16 inch as shown at z of Fig. 1. To make this distance permanent regardless of the shrinking and swelling of the sides, a stop 3/16 inch thick must be glued and nailed upon the bottom of the case b, and the partition f at the place where the back of the bottom edge of the front will strike against it as shown at d s.

The stock list of the case illustrated is as follows:

1	Top	a	⅞" x 21½" x 16¼"
1	Bottom	b	⅞" x 21½" x 16¼"
2	Ends	c	⅞" x 20" x 8½"
1	Back	d	⅞" x 13¼" x 10¼'
1	Partition	f	½" x 2" x 13⅝"
2	Partition	g	½" x 1½" x 17⅝"
1	Partition	h	½" x 2½" x 5⅝"
1	Standard	k	⅞" x ⅞" x 8½"
1	Plug Strip	o	½" x 8" x ½'
8	Drawer Sides	q	½" x 4" x 5¼"
4	Drawer Fronts	t	⅞" x 4" x 6⅛"
4	Drawer Backs	u	½" x 3⅛" x 5⅝"
8	Drawer Bottoms	v	½" x 2 3/16" x 18"
4	Trav. Blocks	w	1⅛" x 2¼" x 5"
4	Front Blocks	x	⅞" x 3" x 5⅛"
2	Drawer Runs	y	½" x ⅞" x 15"
4	Drawer Stops	d	3/16" x ⅞" x 2"
4	Guides	a	½" x 1⅛" x 1¾

---

*¼" is added for milling; back to be 5⅛" long if drawer nailed together square.



A Bungalow With Four Front Doors

By Charles Alma Byers

How the Spanish Idea of an Inner Court Looks in a Bungalow

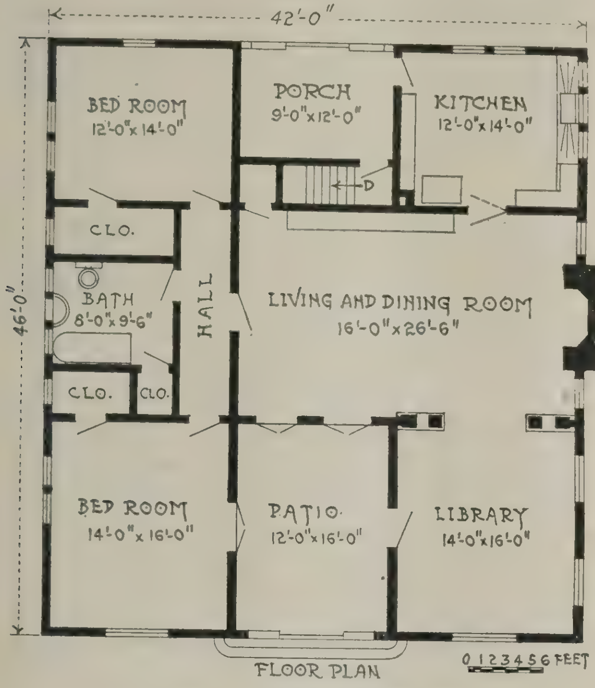
IN Mexico, and in some parts of Spain, it is common to build a house so as to enclose completely an interior yard or court, termed a *patio*. The court itself is not roofed, although around its circumference will frequently be seen a sort of covered porch or corridor. Usually there are flowers and sometimes also a fountain in the center. The visitor must first pass into the *patio*, generally by way of an arched, tunnel-like passageway guarded at the street end by an iron gate. Practically all rooms of the house have doors that open directly into this court.

In the accompanying illustration is shown an attractive little bungalow in southern California, which uses the *patio* idea in a modified way. The court is enclosed by three sides of the house and is more or less exposed on the fourth side to the street. The cement walls project, however, and there is a low iron gate in the center that helps to give a partial seclusion. Further typifying the Mexican and Spanish idea, the court is protected on three sides by an overhanging roof, somewhat suggestive of the usual corridor. In the center of the cement floor is a small rectangle of earth used for growing plants, and doors open from three different rooms into the court. The barred-like little ventilators in the front gables reflect something of the grated windows common to Castilian homes.

The cement wall extending across the front of the house is of brick surfaced with cream-tinted cement stucco. Elsewhere the walls are shingled and stained a rich brown shade, while the trimming is done in darker brown. The roof is shingled and painted grayish green. This gives an effective combination of colors and the flowers and vines in the front window-boxes, together with the other garden work, lend decorative touches of other colors.

French windows open from the combined living and dining room into the court. Entrance from the library to the court is made through the main door of the house.

Certain changes in the interior arrangement are possible if desired. For example, the library may be used as an emergency bed room. The rear porch, adjoining the kitchen, may be converted with a little trouble into either a bed room, a maid's room or a small dining room. In the latter case, the kitchen will require an outside entrance, while a passageway may be provided between the new room and the living room.



Unique California Bungalow
Frank Simmonds, Architect

There are a number of roomy closets and convenient built-in features. These include a closet for each of the bed rooms, a linen closet in the bath room, a closet for wraps, a buffet cupboard in the combined living room and dining room, and buttress bookcases at either side of the colonnade opening in the library.

Pine woodwork is used for the interior finish throughout. The woodwork, in the combination room and the library, is stained in fumed oak style. In the other rooms it is finished in white paint or enamel. The walls of the two principal rooms and one of the bed rooms are papered. In the bath room and kitchen they are finished to a height of five feet with a smooth, hard plaster coat, which is enameled like the woodwork. Elsewhere they are tinted. There are hardwood floors in the library, combination room, front bed room and hall. The living room fireplace has a hearth and brick mantel with wood trimmings.

This bungalow has a small basement, and is heated by a furnace in winter. It is located in Los Angeles, Cal., and was designed by Frank Simmonds, architect, of that city.

Scope of Work of the Forest Products Laboratory

The function of the Forest Products Laboratory is, in the main, twofold, namely, to carry on research and obtain authoritative information concerning wood and other forest products, and to make this information available to the industries and to the general public.

The laboratory is a branch of the Forest Service, U. S. Department of Agriculture, and derives its main support from congressional appropriations. Limited funds are, however, secured through co-operation with private concerns and various governmental bureaus.

All the work of the laboratory partakes of the nature of conservation, since it is all directed toward better utilization of forest products, and each thousand feet saved through better utilization relieves by three the drain upon the forest (based on the fact that only about one-third of the volume of the wood in the forest is utilized as lumber; the other two-thirds being waste).

All the important American woods in commercial use have been tested and their mechanical properties determined, and are available to the industries. Grading rules, based upon the actual strength of the individual sticks, have been formulated by the laboratory and adopted by the two largest soft-wood manufacturers' associations in the country. Improvements in building codes and buildings, as well as in other structural uses of lumber, have resulted from this fund of reliable data on the mechanical properties of wood.

Investigations into the efficiency of many wood preservatives and into the best way to impregnate the important commercial woods of the United States have done much to advance the art of wood preservation. The development of better methods of analysis for wood preservatives and tests on the durability of treated timber under various conditions of service have resulted in much improved specifications for preservatives and for methods of treatment.

Builders' News

Constructive Suggestions

Senate Committee Urges Federal Cooperation, Thrift and Financial Assistance to Avoid Necessity of Building by Government

That the Federal Reserve Act be modified to permit the Board to direct that a portion of the long-term deposits in member banks be invested in long-term securities and mortgages in order to give greater security to the savings and to assist in providing homes for the thrifty.

That the taxation system be revised to encourage the investment in homes and general construction granting a tax exemption to real estate mortgages and on profits in home building for a limited period, provided the earnings are reinvested in home construction.

That principles of Home Loan Bank bill be broadened to permit institutions other than building and loan to rediscount their home mortgages under Federal supervision.

That thrift and savings be encouraged by consolidating all Federal thrift activities under postal savings branch of Post Office.

That Federal Government must continue to stimulate co-operation of labor transportation, finance and fuel production with those engaged in general construction or the growing scarcity of homes may force upon the Government the undesirable participation in housing business.

Announcements

With the merger of the Stanley Rule & Level Company and the Stanley Works, both of New Britain, Conn., it has become advisable to open three new offices on the Pacific Coast. These new offices, which have been in operation since January 1, are as follows:

San Francisco, Cal.—Mr. S. V. Armstrong, district sales manager.

Los Angeles, Cal.—Mr. L. M. Knouse, district sales manager.

Seattle, Wash.—Mr. Bruce Findlay, district sales manager.

The purpose of these offices is to take care of the hardware wants of the Pacific Coast.

The Austin Machinery Corporation announces the consolidation of the F. C. Austin Machinery Company, Inc., Linderman Steel & Machine Company, F. C. Austin Drainage Elevator Company, Toledo, Bridge & Crane Company, Municipal Engineering & Contracting Company, and other large manufacturers of kindred lines with plants at Toledo, Ohio, Muskegon, Mich., Winthrop Harbor, Ill., and Woodstock, Ontario.

The combined energy and capacity of these organizations will be devoted to mass production and to supply the most complete line of earth-moving and concrete-mixing machinery to meet an unprecedented period of construction, good road-making, reclamation, excavation and irrigation.

Distributing points will be extended throughout the world to facilitate the service and distribution of this broad line of contractors' requirements.

The T. L. Smith Company, whose general sales offices have been located at 470 Old Colony Building, Chicago, has moved this entire department and its complete personnel to Milwaukee, Wis., where it will be located from now on at the factories, 1125 32d street. The advertising department will also operate from the factory from now on.

The Union Label on New Buildings

The Building Trades Council of Cleveland and St. Louis have decided that after September 1 all buildings in course of erection must bear the union label.

All contracts for work on a building must be awarded and the architect must submit these contracts to the secretary of the Building Trades Council, and if he is satisfied that each and every branch of the work in connection with the building will be done by union men, a permit is granted whereby the contractor may proceed with his work.

The union label must be posted in a conspicuous place on the work, and mechanics are furnished with a special working card for each particular job, giving the name of owner, contractor, location, etc.—*Bulletin, Pittsburgh Builders' Exchange.*

We understand that Cleveland employers are paying no attention to this decision.—Editor.

Lest We Forget

The Review, published by the Master Builders Association of Boston, finds that it is necessary again to remind their members that when work, beyond what is called for by specifications and drawings, is *verbally* ordered by either architect or owner, the contractor should secure confirmation *in writing* to make his claim for payment legally sound.

Lumber Market Review

Prices Drop Again in January, But It Looks as If the Bottom Has Been Reached—Increase in Inquiries Forecasts Early Spring Buying.

THERE was another general decline in wholesale prices of all construction woods during the past month, but at the close of January the prospects for stability were more favorable than at any time since the landslide in values began last summer. The most notable reductions since January 1 were in North Carolina pine flooring and other items of upper grades, and in the better grades of Southern yellow pine and Douglas fir. The lower grades of these principal construction woods showed little change, for the very good reason that before the arrival of the new year these items were wholesaling below actual cost of production. As soon as the "uppers" get back to a more normal level—and in some woods they already have reached that point—a stable market may be expected. This means that the bottom of the lumber market has almost been reached, and as soon as buying is resumed to the extent that producers feel justified in resuming operation the upward trend will begin.

Early Spring Buying Probable

The marked increase in the number of inquiries from retail dealers, especially those in the agricultural sections of the middle west, indicates that buying will begin very early this Spring. In the South and on the Pacific Coast this buying is already beginning to develop, but it has not yet reached any marked volume. During the past ten days inquiries have become more active in the large eastern markets, such as New York, Philadelphia, Boston and Baltimore, and while the retail lumber yards in those centres as a general rule are fairly well stocked with lumber, their stocks in many instances are badly broken and a large quantity of certain grades and sizes will be required to fill these gaps. Considering the potential demand for buildings of all kinds and particularly housing structures, the available lumber stocks are not by any means too large. Thirty days of active buying would diminish lumber piles in retail yards to practically nothing.

Mill Conditions are Improving

Conditions at the mills are also improving. Ninety per cent. of the leading lumber mills in the South and on the Pacific Coast have been closed down for some time. Those which are still operating are cutting wage scales from 25 to 30 per cent. Stocks at the mills are larger than they were last winter, but not up to pre-war normal. They are decreasing gradually because of the stoppage of production, and the mills will not resume operation until their owners are assured of a fair volume of business at a fair margin of profit. It is safe to say that the mills today would not sell, at prevailing market prices, a single car of newly-produced lumber. They are liquidating their surplus stocks at a sacrifice because they want to turn their lumber into cash. Any new lumber produced will sell on a higher level. This is clearly indicated by the fact that the manufacturers have made it generally known that they will not again start up their plants until the market is more active and until prices are more in keeping with costs of production. The cut in wages has enabled the producers to reduce production costs to some extent, and for this reason it will not be necessary to boost selling values up to last year's peak, but prices will undoubtedly be higher ninety days hence than they are today. In the middle west there have been no reductions in prices to speak of in three weeks, which means that the turning point is about here. This condition will be reflected in eastern markets early in February.

Indications of Early Resumption in Building

Lumber has taken the lead of all building materials in price reductions, and lumber is used more in individual housing construction than any other material. This fact, if made known to the prospective builder, should encourage early Spring building. Transportation conditions have improved to the point where exceedingly prompt deliveries of lumber orders may now be relied upon. Building labor is plentiful and there is no indication of labor trouble. On the other hand, men are seeking jobs today, and it is highly possible that labor conditions will continue to grow better and that wage scales may actually be reduced in the building trades. Certainly labor costs will not increase this year. Both transportation and labor conditions, therefore, are highly favorable to an early resumption of building. The lumber producer is aware of this, and he looks for a good volume of business for the last nine months in 1921.

Building Operations in 1920

Review of 1920 with a Forecast for 1921

THE year 1920 opened with a rate of construction activity unprecedented for the winter season. Total contracts reached a maximum of over three hundred million dollars in the month of April. From that time on, for causes well known generally, activity declined more or less steadily to the end of the year. December contracts amounted to one hundred million dollars.

The amount of money involved in construction contracts during 1920 in the twenty-five Northeastern States of the country was practically the same as in 1919, according to statistics compiled by the F. W. Dodge Company. On account of greatly increased construction costs, this amount of money, something over two and a half billion dollars, paid for a volume of construction that was nearly one-fourth less in 1920 than in 1919.

Comparing the past two years, the most conspicuous feature of 1920 was the decline in residential construction. This class of construction represented 33% of the total in the year 1919, and 22% of the total in 1920. The amount of residential floor space contracted for declined from 240,000,000 square feet in 1919 to 136,000,000 square feet in 1920.

In the amounts of money involved in 1920 contracts, industrial plants and public works and utilities both exceeded residential buildings, each representing about 23% of the year's total.

There was in 1920 an increase over 1919 in actual volume of construction of educational buildings.

In normal years the total estimated cost of contemplated or projected work reported is about 50% in excess of the total amount of contracts awarded. In 1919 the total of projected work was 68% in excess of contracts awarded; in 1920 it was 92% in excess of contracts awarded. These figures give an indication of the amount by which each of the two years has run behind its announced construction program.

FORECAST FOR 1921.

The construction industry enters the new year under conditions very similar to those that prevailed at the opening of the year 1919.

There is a considerable accumulated demand for building, and activity is very slow on account of unstabilized price conditions and hesitation on the part of prospective builders because of uncertainties of future market conditions.

At the opening of 1919 building material prices had remained, on the average, at about the same level for four months. They continued at this level during the first quarter of 1919. About April, 1919, many people were convinced that building costs would not fall, and activity increased rapidly. About two-thirds of the total of that year's activity was contracted for during the second half of the year.

It seems likely that a somewhat parallel movement may be expected in 1921. Material prices have not as yet reached the stage of stabilization they had reached at the opening of the year 1919. Apparently some further declines are to be expected. It seems likely, however, that the period of stabilization and of hesitation on the part of the buying public need not be so prolonged as it was two years ago. When costs are actually stabilized it should be more easy this time to convince the public that such is the case.

In an analysis of the present price situation, a well-known authority has stated that the upward turn in material prices will probably occur some time in 1921, and that, in consequence, building costs in 1921 will be somewhat lower than they have been in 1920 or will be in 1922 and 1923.

If that be true, then price conditions will be more favorable to building activity in 1921 than they were in 1920 or will be next year. If the public comes to believe that is the case, then a resumption of activity should be expected in 1921.

Not a few leaders in the construction industry expect a revival of construction activity in the spring, to be followed by increased activity through the summer and fall.

Awakened interest in construction activity is shown by the fact that the amount of contemplated work reported in December aggregated more than for any month since June.

A volume of construction equal to that of 1919 on a cost basis somewhere near the 1919 level may be given as the most reasonable forecast for 1921. In money this would involve about two and a half billion dollars for the twenty-five Northeastern States of the country, the same as the figure for 1920, though on a cost level that should represent a volume approximately one-third greater than the 1920 volume of construction.

Developments of the next three months should indicate whether the year's total of construction activity is likely to be nearer to two and a half or to three billions of dollars.

In 1921, residential construction and the construction of public works and utilities may be expected to predominate over other classes of buildings.

Building Operations for 1920

	CLASS OF BUILDING												
	Residential		Industrial		Business		Public		Other			Increase over 1919	Decrease under 1919
Section of Country	Dollars	%	Dollars	%	Dollars	%	Dollars	%	Dollars	%	Total Dollars	%	%
New England	80,436,000	26	79,999,000	26	60,728,000	20	39,094,000	13	46,718,000	15	306,975,000	29	..
New York	133,096,000	22	110,757,000	18½	111,844,000	19	156,326,000	26	83,911,000	14½	595,934,000	10	..
Middle Atlantic	79,400,000	26	80,935,000	27	49,050,000	16	47,383,000	16	44,304,000	15	301,072,000	..	24
Pittsburgh Dist.	109,456,000	23	111,891,000	24	58,342,000	12	116,433,000	25	71,119,000	16	467,241,000	6	..
Central West	141,756,000	18	198,487,000	25	130,355,000	16	209,879,000	26	120,330,000	15	800,807,000	..	10
Northwest	21,788,000	24	9,895,000	11	9,828,000	11	25,128,000	27	25,914,000	27	92,553,000	..	..
Grand Total											2,564,582,000	..	..

Actual volume of construction 25% less than 1919.

Legal Department

Decisions

WHEN ARBITRATION CLAUSE OF BUILDING CONTRACT IS WAIVED

That a contractor will be released from the binding effect a clause in a building agreement when the owner disregards it is shown by the decision of the Appellate Court of Indiana in the recent case of Hooker vs. C. R. Pease Construction Co., 127 Northeastern Reporter, 156.

The building contract involved in this litigation contained the following clause:

"Art. III. No alterations shall be made in the work herein except upon the written order of the architect; the amount to be paid by the owner, or allowed by the contractor by virtue of such alterations, to be stated in said order. Should the owner and contractor not agree as to the amount to be paid, or allowed, the work shall go on under the order required above, and in case of failure to agree, the determination of said amount shall be referred to arbitration, as provided in Article XII of this contract."

The court holds that this clause lost its force when it was entirely ignored by the owner, who gave directions concerning the work and changes in the construction thereof without consulting the architect.

WHEN A STRIKE IS NOT A STRIKE

The Washington Supreme Court makes an important distinction between a "strike" of building employees and a definite quitting of union workers in a body, in the case of Uden vs. Schaefer, 188 Pacific Reporter, 395.

Defendant, having a contract to install plumbing and a heating system for plaintiff, gave a bond to secure performance of the contract. But the bond contained a proviso "that the surety shall not be liable for any damages resulting from so-called strikes or labor difficulties," etc.

Defendant was suspended from an association of plumbers and heating engineers—presumably because he took the contract at a lower price than had previously been bid in bidding by him and other members of the association. Thereupon his union employees quit his service, under a union agreement with the association that they would not work for any contracting plumber not in good standing as a member of the association.

The surety pleaded this quitting and the above mentioned provision of the bond as exonerating it from liability on defendant failing to perform the contract, but the court holds that the clause did not apply.

"In our opinion, these facts do not exonerate the appellant from the obligations of its bond. In the common acceptation of the term, it is not a 'strike' for the workmen of an employer to quit his employment and go elsewhere, without any intention of returning; nor is it a 'strike' for workmen to refuse to enter into the employment of a particular contractor. A 'strike,' in such common acceptation, is the act of quitting work by a body of workmen for the purpose of coercing their employer to accede to some demand they have made upon him, and which he has refused; but it is not a strike for workmen to quit work, either singly or in a body when they quit without intention to return to the work, whatever may be the reason that moves them so to do. * * * By his [defendant's] own act he had placed himself in a position where certain workmen could not remain in or enter into his employment without violating their agreement, and others he could not obtain, and in no sense can this be denominated a strike.

"The addition of the phrase 'labor difficulties' to the term 'so-called strikes' does not enlarge the meaning of the latter. It is rather definitive than expansive of it. In other words, the phrase is but explanative of the meaning of the word 'strike,' and any act of the workmen which would not constitute a strike would not constitute a labor difficulty."

SCOPE OF SUBCONTRACTOR'S BOND.

A bond securing performance of a subcontract for building construction did not render the sureties liable for repayment of money paid by the contractor to the subcontractor in excess of the amount due, holds the Texas Court of Civil Appeals in the recent case of McGregor & Henger vs. Escajeda, 216 Southwestern Reporter, 398.

In this case plaintiffs having a contract for the construction of a building in El Paso awarded the subcontract for brick and tile work to one Maese, agreeing to pay him stated amounts for different classes of work, and to advance sufficient funds to meet the subcontractor's pay roll each week; final payments of the balance of the subcontract to be made within thirty days after acceptance of the work.

After all the work was done it appeared that the subcontractor had been overpaid more than $400, and the contractors sued to recover this amount. Affirming a decision of the trial court that plaintiffs were not entitled to recover against the sureties, the Court of Civil Appeals said:

"Of course, Maese is legally bound to repay to plaintiffs the overpayments which they have made to him; but there is no express provision therefor in the subcontract or the bond. His obligation to make such repayment thus arises upon an implied contract. Since Maese has performed the service which he undertook to perform and has discharged every obligation which he expressly assumed, we are of the opinion that the condition of the bond was thereby fulfilled and the liability of the sureties ceased. To hold the sureties liable upon the present demand would impose a liability which neither they nor Maese had expressly assumed. It would impose a suretyship liability upon an implied and collateral contract of the principal, Maese. It would by implication extend their liability beyond the terms of their contract. This is not permissible."

ENCROACHMENTS ON PROPERTY LINES

A decision of the Alabama Supreme Court, handed down in the case of Eros *vs.* Wells Amusement Co., 85 Southern Reporter, 692, establishes the proposition that where one has constructed a building on his lot with one of the walls flush with the property line the subsequent act of the adjoining lot owner in affixing the flange of a composition roof of a lower building constructed by him to such wall, without the first owner's consent, constitutes a private nuisance subject to abatement in an injunction suit brought by the first owner. The court says:

"The process of attaching the roof to this wall appears to be permanent in character. . . . This use of plaintiff's wall was of such character as to afford the basis for the acquiring of an adverse right or easement, thus laying the foundation for a right or easement that might, if perfected, impair the value of the property; and this condition has been held to entitle the owner, whose right to immunity from invasion has been violated, to the remedy by mandatory injunction."

Answers to Inquiries

BUILDING RESTRICTIONS

I own two large lots near White Plains, N. Y., and would like to erect a one-car stucco garage on them. I wrote to the Department of Public Works, asking them for a copy of the building code, but have not received one. I intend to do the building myself. Must I obtain a permit to carry on the work? If so, where must I apply and what are the charges? How near the boundary line may I build? My deed reads: "That there shall be permitted to be erected and maintained on said premises a private dwelling house only, which shall cost at least the sum of $2,000 to erect." Would I violate the deed by erecting a garage? I am erecting a garage now to save winter storage, etc. I intend to erect a home on the site as soon as materials, etc., drop in cost to the point where they should be, which I hope will be next spring. Would my taxes be increased when the garage is completed? The person from whom I bought the lots had laid a two-inch water line from the regular mains to a spot about 100 feet from me, and I have the privilege of tapping in. As there is only a dirt road would there be a permit needed to open the road to tap onto the line. If so, what would the charges be, and where must I apply for the permit? Would I have to have a licensed plumber make the connections?—*T. J. C., N. Y.*

Any and all requirements for a building permit, or for permit to open the street, or for employing a licensed plumber will depend upon the ordinances in force in White Plains. Since we do not have them before us, we must suggest that you either write to, or call at, the city clerk's office in that city for information on these points.

The city has nothing to do with the legal effect of the building restriction in your deed. The only parties who are entitled to complain of any violation of that restriction are the owners of the surrounding lots for whose benefit the restriction was imposed. But if they object I am afraid that they could secure an injunction against your construction of the proposed garage.

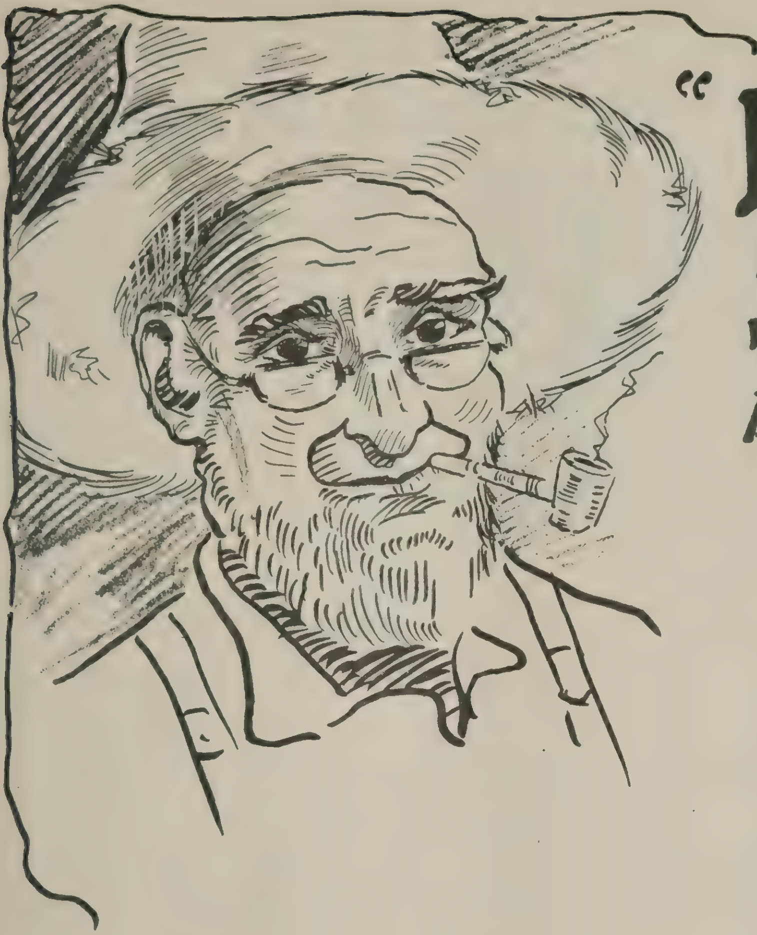
There is a general rule of law that was frequently applied before the advent of automobiles, that a restriction of the use of premises to dwelling-house purposes did not prevent construction of such appurtenant outbuildings as private stables, etc. But the law, as now applied to garages, is authoritatively summed up as follows: "The usual outbuildings appurtenant to a dwelling house have been held not to include a garage or storehouse for automobiles; and a covenant providing that the premises shall be used for residence purposes only, and that no building or structure of any kind whatsoever other than a dwelling house shall be erected thereon, is violated by the erection and maintenance of a garage." 18 Corpus Juris, 392. The decision of the Appellate Division of the New York Supreme Court in the case of Hepburn vs. Long, 146 App. Div. 527, 131 N. Y. S. 154, is cited in support of this statement.

It is a close question, however, and one can only guess what a judge might hold as to whether your deed excludes a garage. On one hand, the deed says that there shall be a dwelling house "only." This would seem to exclude a garage. On the other hand, the view might be taken that the deed was not intended to exclude such customary outbuilding.

The chances of your being enjoined against proceeding with your present plan would be increased by the fact that you are postponing erection of the dwelling house. In support of an objection on this ground, one of your neighbors, or the person from whom you bought, might cite the court holding that "where a restriction provides that the property shall be used for residence purposes and that no residence costing less than a certain sum shall be erected, it will prevent the erection of a stable without the erection of a dwelling house" 18 Corpus Juris, 392.

You might consult the person from whom you bought and other persons apt to object, and ascertain whether they will interpose objection to your plan. If they assure you that they will not object, you may safely proceed. Otherwise, you can proceed only subject to the possibility of being called on to defend injunction proceedings. And as to how they would terminate we have already expressed the view that that is uncertain.

Property is valued annually in New York for the purposes of taxation. So there would be no increase in your taxes until reflected by the first annual assessment of your property made after completion of your improvements.



Are You Handling the line of door hangers that most farmers prefer to buy?

Here are a few reasons why farmers prefer the National "Big 4" Hangers:

They are built entirely of steel with anti-friction steel roller bearings to insure easy running.

The axles and rivets are sherardized to prevent rust. Two studs, together with the hook which turns under the rail, prevent the hanger from jumping the track.

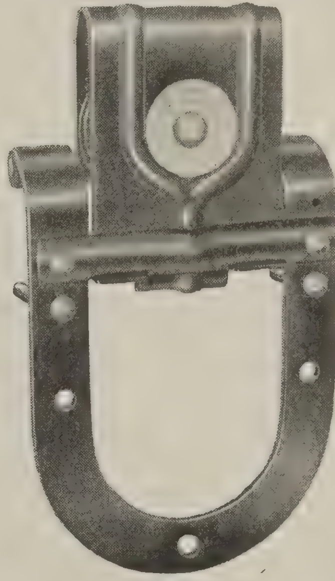
In short, the "Big 4" Hanger is very strongly made, yet simple in construction—nothing to get out of order.

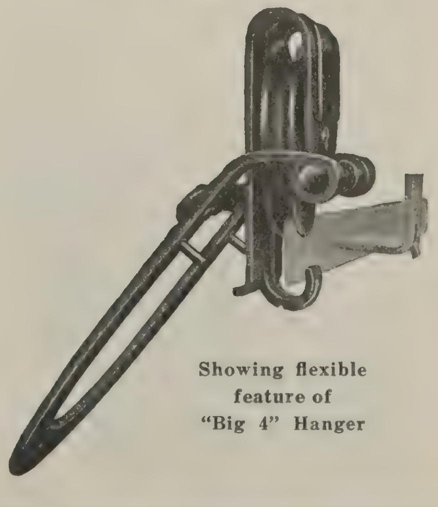
Our catalog gives further details and shows the complete line of fast-selling National Hardware.

If your dealer does not carry the Improved Big Four, send us his name. Catalog mailed on request.

National Mfg. Co.

Sterling, Ill.





Showing flexible feature of "Big 4" Hanger

New Catalogs and Publications

New Catalogs

These catalogs may be secured direct from the manufactuer. If you prefer, write the date of this issue and the numbers of any catalogs on a postal and mail it to "Building Age," 243 West 39th Street, New York City, The catalogs will be sent you without charge or obligation.

406. **Grimm's Corrugated Galvanized Wire Lathing.** Buffalo Wire Works, Buffalo, N. Y.—Illustrated booklet 61-F treats fully of the subject of wire lathing and describes the advantages of Grimm's corrugated galvanized wire lathing which is especially adapted for stucco work.

407. **Boyle's Bayonne Roof and Deck Cloth.** John Boyle & Company, Inc., New York City.—Sample Book "R" gives prices and specifications for laying this roof covering, which is especially adapted for the roofs and decks of sleeping porches, piazzas, conservatories, etc.

408. **The Pullman Sash Balance.** Pullman Mfg. Company, Rochester, N. Y.—Illustrated catalog describing the construction of the Pullman sash balances which are made of pressed steel.

409. **Alpha Aids.** Alpha Portland Cement Company, Easton, Pa.—No. 24 of this house organ has for its leading article "Making the Cold Months Count." Contains other helpful data on the subject of concrete, and gives a summary of things to be remembered when doing cold-weather concrete work. Fully illustrated.

410. **Johns-Manville Asbestos Shingles.** Johns-Manville Company, Inc., New York City.—Literature illustrating and describing how old wooden shingle roofs can be covered with Johns-Manville Asbestos Shingles. The process is a simple one, consisting of leaving the old shingle on the roof and merely nailing the asbestos shingles over them.

411. **Service Sheets.** N. & G. Taylor Company, Philadelphia, Pa.—Service Sheets 1, 2, 3, 4 No. 18 give large sized details of the construction and application of tin roofings to decks, domes, ridge, mansard and other types of roofs, with many specialties of hip, valley and gutter construction. Book entitled "Roof Designs" will also be sent with these service sheets on request.

412. **Kodak on the Job.** Eastman Kodak Company, Rochester, N. Y.—Illustrated catalog describing the advantages of having a Kodak camera while construction work is going, by means of which daily negative, with its autographic date and title on the film, can be kept. This makes the progress record authentic and reliable.

413. **Vulcanite Roofing.** Roofing Division, The Beaver Board Companies, Buffalo, N. Y.—Catalog illustrating and describing the Vulcanite Self-Spacing Shingles which are fire-resisting and weather-proof and make a sealed-tight roof.

414. **"R. I. W." Protective Products.** Toch Brothers, New York City.—Booklet describing the various protective products manufactured by this concern. Buildings on which these paints were used are illustrated.

415. **Cabot's Stains and Quilt.** Samuel Cabot, Inc., Boston, Mass.—Literature describing the creosote stains made by this firm. These stains can be used for roofs, siding, timbers and all other outside woodwork. Points out the advantages of Cabot's Quilt which, it is claimed, is a very efficient heat insulator. Samples furnished on request.

416. **Fiberlic Wall Board.** MacAndrews & Forbes Company, New York City. Literature pointing out the advantages of using this wall board for strong, permanent, economical and sanitary construction.

417. **Bay State Coating.** Wadsworth, Howland & Company, Inc., Boston, Mass.—Booklet No. 19 describes the Bay State Brick and Cement Coating which is manufactured in white and a range of colors. Illustrations show a number of houses on which Bay State Coating was used.

418. **Sharp Rotary Ash Receivers.** Sharp Rotary Ash Receiver Company, Inc., Binghamton, N. Y.—Illustrated catalog describing this labor-saving device which does away with the tedious and unhealthy procedure of shoveling ashes.

419. **Service Sheets.** Architectural Service Corporation, Philadelphia, Pa.—Literature descriptive of these service sheets which are detailed data sheets showing the correct and most efficient use of up-to-date building materials.

420. **Elevators.** J. G. Speidel, Reading, Pa.—Literature describing the elevators manufactured by this firm for hand, belt and electric service. Dumbwaiters and sidewalk lifts are also made by this same firm.

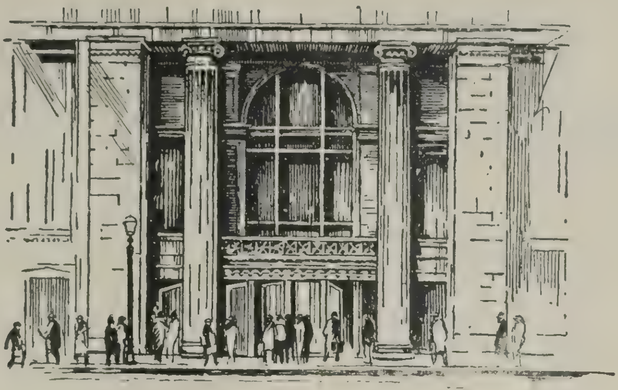
421. **Monarch Radiant Asphalt Shingles.** Stowell Mfg. Company, Jersey City, N. J.—Illustrated booklet describing these shingles which, it is claimed, cannot curl, require less nails per square and are the easiest to lay over old shingles. Prices furnished on request.

422. **Bermico Sheathing Paper.** Paper Sales Division, Brown Company, Portland, Me.—Literature describing and illustrating the sheathing paper manufactured by this company.

423. **Neponset Black Waterproof Building Paper.** Bird & Son, Inc., Dept. B, East Walpole, Mass.—Descriptive literature pointing out the superior qualities of this building paper which is both waterproof and airproof, and which can be used to advantage underneath clapboards, back of stucco, under roofings and between floors.

424. **Open the Door to Bigger Profits.** Wagner Mfg. Company, Cedar Falls, Iowa.—Illustrated folder describing the different styles of garage door hardware manufactured by this company. The special features of the No. 58 Cloztite Hanger for folding-sliding doors are brought out. Several types of complete garage door sets are described and illustrated. Prices are included.

425. **San-O-La Fine Bathroom Ware.** Art Brass Company, Inc., New York City.—Catalog E describes and illustrates the various types of San-O-La bathroom equipment manufactured by this company.



For Active Doors

ON entrance doors to office buildings, hinges meet a true test for service. Here doors never rest—all day long they swing in and out, marking the surge of travel. The hinges that give these doors activity must stand constant strain, be strong, durable—and yet add a touch of beauty.

McKinney Anti-Friction Butts are designed particularly for this heavy work. Every day on millions of doors in thousands of buildings they prove their worth by work effectively done in hushed silence. Other McKinney Hinges and Butts are designed with equal thought for the task to be performed. From the smallest to the largest they combine true craftsmanship with practical everyday usefulness.

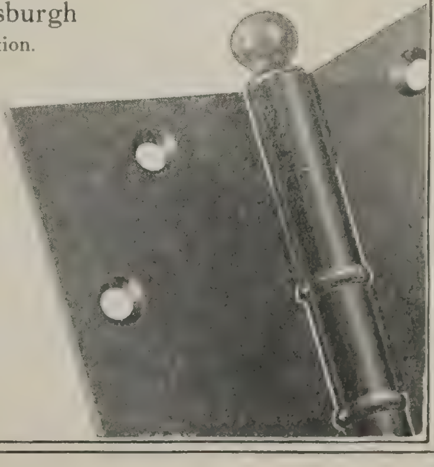
The McKinney Manufacturing Company has been making hinges and butts for fifty years. These products are the standard bearers in their field. Architects and Builders, who take pride in the buildings they create, appreciate the worth of the name McKinney in making a careful selection of hinges and butts.

Architects and Builders will be interested in two booklets prepared by the McKinney Manufacturing Co. One of these is on hinges for the home and the other pictures and explains hardware for garage doors of all kinds. Both these booklets will aid in selecting proper hardware to blend with architectural designs. These booklets and the McKinney catalog will be sent upon request.

McKINNEY MANUFACTURING CO., Pittsburgh
Western Office, State-Lake Bldg., Chicago. Export Representation.

McKINNEY
Hinges and Butts

Also manufacturers of McKinney garage and farm building door hardware, furniture hardware and McKinney One-Man Trucks



426. **Prudential Steel Buildings.** Blaw-Knox Company, Pittsburgh, Pa.—Illustrated catalog No. 21 describes the Prudential Steel Buildings which are standard in principle and universal in application, and gives an idea of the design and construction of these buildings, and their adaptability to various purposes. Complete standard specifications are included. Other products made by this same company are listed.

427. **The Roof Beautiful.** Ludowici-Celadon Company, Chicago, Ill.—Book telling the story of the origin and use of roofing tiles. Specific information is given concerning the different styles of roofing tiles made by this company. Contains numerous illustrations of houses on which tile roofs have been used.

428. **Forestry and Farm Income.** U. S. Department of Agriculture, Washington, D. C.—Farmers' Bulletin No. 117 contains some interesting information on farm forestry and why it pays. It treats of the extent of farm woodlands, value of woodland products, fire protection, grazing and insect damage, planting forest trees, etc. Profusely illustrated.

429. **Elastica, the Stucco of Permanent Beauty..** U. S. Materials Company, Chicago, Ill.—Extensively illustrated book bringing out the desirability of using Elastica as an etxerior building product. The advantages and superiorities of this material are emphasized. Photographs of a few of the structures on which Elastica stucco was used are reproduced, as are also several testimonial letters from contractors and architects.

430. **"National" Tubular Steel Poles.** National Tube Company, Pittsburgh, Pa.—"National" Bulletin No. 14-C describes in an interesting way the history of the tubular steel pole, pointing out the various uses to which it can be put, its characteristics and advantages. Numerous tables showing all standard poles manufactured by this company are included. Various styles of pole tops are shown. Extensively illustrated.

431. **Garment Care System.** Knape & Vogt Mfg. Company, Grand Rapids, Michigan.—Illustrated booklet describing system of garment carriers and hangers which make possible much saving in floor space for closets. By this system full utilization of closet space can be accomplished. American Gas Fired Automatic Water Heaters. American Heater Corporation, St. Louis, Mo.—Booklet illustrating and describing the construction, operation and advantages of the American heater, laying special stress on the exclusive features possessed by this heater.

432. **Clay Carrier Systems.** Iowa Gate Company, Cedar Falls, Iowa.—Catalog No. 13 describes how the Clay carrier systems transform the farm's greatest drudgery into an easy task. The construction and operation of some of these carrier systems are described and illustrated. Instructions for the installation of these systems are given. Mention is also made of additional Clay Steel products, including steel gates, sanitary barn equipment and ornamental fences. Catalogs covering these latter subjects are also obtainable on request.

433. **Guarding the Minute.** International Time Recording Company, New York City.—Attractive little book, both the physical appearance of which and the character of material included make it well worth studying. Not only the mechanism of the Time Recorder itself is given, but very interesting data regarding its application to practically every kind of industrial and office establishment. The various types of machines cover all "time" information from the simple recording of the hours of labor of individual employees to job time records on individual operations and duties. Machines are available from the simple one for the small office to the Master Clock operating time recording devices throughout a plant. This information is particularly valuable to the architect who has occasion to design industrial buildings, for this is a service for which he must provide in his plans and specifications. A new device of unusual interest is the "International Door Lock" by which can be automatically registered the time of turning the lock and the individual who operates the lock. This should find application in a great many places such as banks, schools, private offices, hotels and special rooms of private establishments.

434. **The Proper Treatment for Floors, Woodwork and Furniture.** S. C. Johnson & Son, Racine, Wis.—Handsomely illustrated booklet explaining the various color effects obtainable from the use of Johnson's Artistic Wood Finishes. This booklet resolves itself into an authority on wood finishing, containing the latest, most practical, concise instructions for finishing wood either in stained or enamel effects.

New Publications

Hendricks' Commercial Register of the United States.

29th Annual Edition. S. E. Hendricks Co., Inc., New York City.

The 29th annual edition of "Hendricks' Commercial Register of the United States for Buyers and Sellers for 1921" has just been published. All of the good points found in the previous edition have been retained and several improvements have been made. One of the striking features of the book is its simple method of arrangement and complete index, making it the most easily used book of its kind we have seen. This feature should at once appeal to the busy man. The ease of use is further increased by the interior index, a valuable addition made last year and continued in the new edition. The numerous lists relating to various industries will be found very helpful. The book also contains many advertisements which in no way obscure the lists, but, in fact, give the user much additional and valuable information.

On the whole, the new volume is most complete and should prove itself indispensable in any well organized purchasing or sales department.

Handbook of Building Construction.

By George A. Holl, S.B., and Nathan C. Johnson, M.M.E. Flexible cloth, 6"x9", two volumes, 1474 pages. Fully illustrated. McGraw-Hill Book Co., Inc.

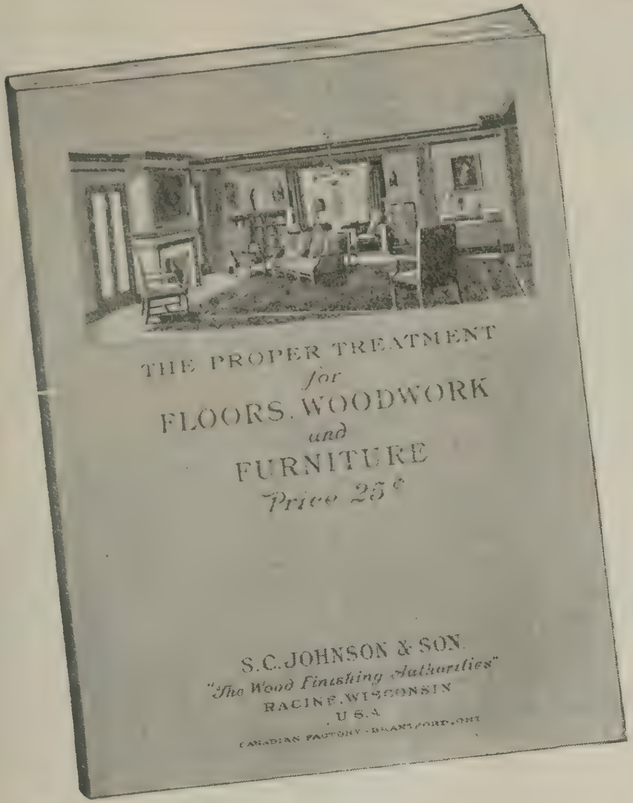
This work is the most complete study on the subject we have ever seen. The editors-in-chief have been assisted in its preparation and presentation by no less than forty-six specialists. These two volumes deal with the subject of building construction in three parts, covering every phase of it in detail. The text is well and clearly illustrated by many cuts.

Part I deals thoroughly with building design and construction, giving particular attention to modern methods and equipment.

The matter of estimating and contracting is handled in Part II and, like Part I, this is very complete.

The mechanical, electrical and sanitary features of building construction are treated with the same completeness and thoroughness in Part III.

We are glad to call the attention of our readers to this book because it is the most comprehensive treatment of the subject ever brought to our attention. It should prove a valuable addition to the library of the architect, engineer, contractor and builder.



Get This
Valuable Instruction Book on Wood Finishing

IT'S the best book ever published on Artistic Wood Finishing. It is written for the practical man—contractor, builder, architect, painter, interior decorator, etc. Contains practical suggestions on finishing woodwork, floors and furniture—both hard and soft woods. Tells how to finish wood in beautiful stained effects with *Johnson's Wood Dye* and in enameled effects with *Johnson's Perfection Enamel.* This book is the work of famous experts—illustrated in seven colors.

How to Get It Free

GO to your best dealer in paints and ask for a copy of Johnson's book, "The Proper Treatment for Floors, Woodwork and Furniture." If he is unable to furnish the book ask him to send your name and address to us and we will gladly mail you a copy free.

JOHNSON'S ARTISTIC WOOD FINISHES

THE perfection of Johnson's Artistic Wood Finishes has been the work of years. You get the benefit of our experience—of our money expenditure—of our knowledge of woods. Our plant is equipped with the best up-to-date mills and machinery and every department is in the hands of experts.

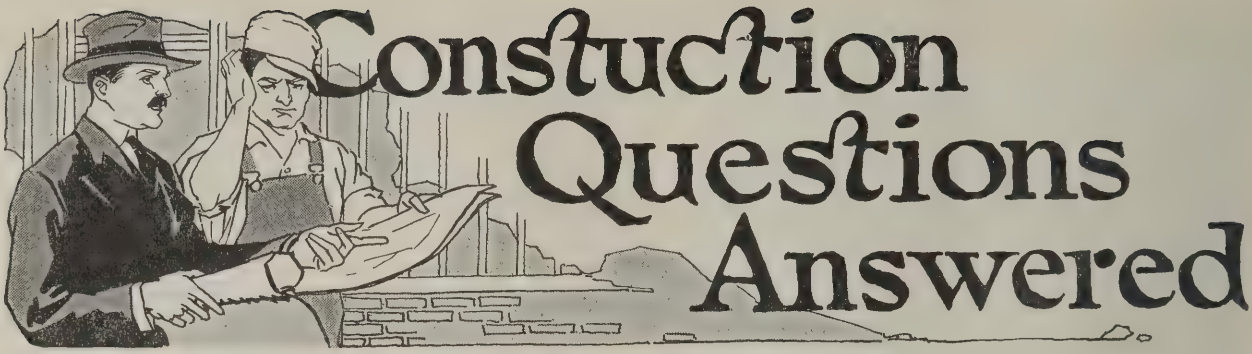
Johnson's Artistic Wood Finishes are being used all over the United States and Canada by manufacturers of the highest class furniture, who realize the importance of a perfect finish on their fine furniture and pianos.

Our line of Artistic Wood Finishes is complete—it includes:—

Johnson's Prepared Wax
Johnson's Wood Dye
Johnson's Crack Filler
Johnson's Paste Wood Filler
Johnson's Perfectone Undercoat
Johnson's Perfectone Enamel
Johnson's Electric Solvo (varnish remover)
Johnson's Floor and Finishing Varnishes

Build up your reputation on the sound foundation of good workmanship and Johnson's Artistic Wood Finishes—then there will never be any slack season for you.

S. C. JOHNSON & SON, Dept. BA-2
"The Wood Finishing Authorities"
RACINE, WIS.



Constuction Questions Answered

SETTING LIMESTONE IN CEMENT MORTAR.

Will you kindly tell me what I should do to prevent the appearance of stains and efflorescence on the face of limestone or marble?—*J. J. M., Lincoln, Neb.*

The satisfactory setting of limestone or marble in cement or cement mortar has been quite a problem to builders in many sections of the country. In a great many localities the available sand and water do not present any particular difficulty. It is where the water contains considerable iron, sulphur or salts in solution that special precautions are necessary. It is, therefore, essential to use the best water obtainable in the locality.

Stains may also be due to the use of an inferior cement in the mortar. A high grade white portland cement should be used. There are many stainless cements now on the market, but great care should be used in their selection. Some stainless cements are not stainless under all conditions.

Another source of difficulty lies in the sand used. It is essential that the sand be clean. In inland cities the sand is not apt to contain as much salts as on the coast, but it does often contain a large proportion of clay with a high oxide of iron content. The amount of impurities in sand can be roughly determined by shaking a sample in a glass of water. This will settle, leaving the mud and scum on top. If the sand is very dirty, it must be washed.

All sides of the stone should be washed clean just prior to setting and the back should be thoroughly plastered with the same mortar used for the bed. Where ordinary cement mortar is made use of for laying the brick backing, the first course of the backing should be laid in the same mortar as the stone. Only a hard-burned brick or tile should be used for backing-up purposes.

The face of limestone is also protected from stain by back painting with an asphaltum paint or by plastering the back with a coat of non-staining cement mortar. When the backing is laid in ordinary cement mortar, either or both of these methods is essential.

When efflorescence occurs it is due to some soluble element in the mortar of the backing material. For example, if a soft brick is used and the work is laid in cold weather, making it advisable to soak the brick, such a brick will absorb water from the mortar. The salts held in solution will eventually be drawn to the surface of the wall in the drying-out process and will appear in the form of efflorescence. This emphasizes the necessity of a hard-burned brick and of high grade cement.

Some dampproof preparations are in themselves injurious and care must be taken in selecting them that they do not contain oils or other discoloring elements, or that they are not thinned down by gasolene. Where the facing stonework is laid directly against reinforced concrete, the dampproof painting should be applied to the face of the concrete work rather than to the stone. It is generally advisable to allow about an inch of space between the back of the stone and the face of the concrete. This should be filled with the same mortar used in the setting of the stonework.

METHODS OF HARDENING GYPSUM.

Can you suggest some means of hardening gypsum or outside plastering?—*H. T., Montreal, Canada.*

No means of hardening gypsum for outside plastering has been developed for use in this country. We understand that gypsum is being used for this purpose in some European countries, but that its application requires such an excessive amount of labor as to make its use in the United States or Canada prohibitive as to cost.

Gypsum plaster manufacturers do not recommend gypsum for outside (exposed) plastering. Where such is used, as in the "staff" applied for temporary exhibition buildings, the surface is waterproofed with any one of many substances made for such purposes. It has never been possible, with the present known methods of waterproofing, to permanently protect gypsum plastered surfaces from the action of water and frost.

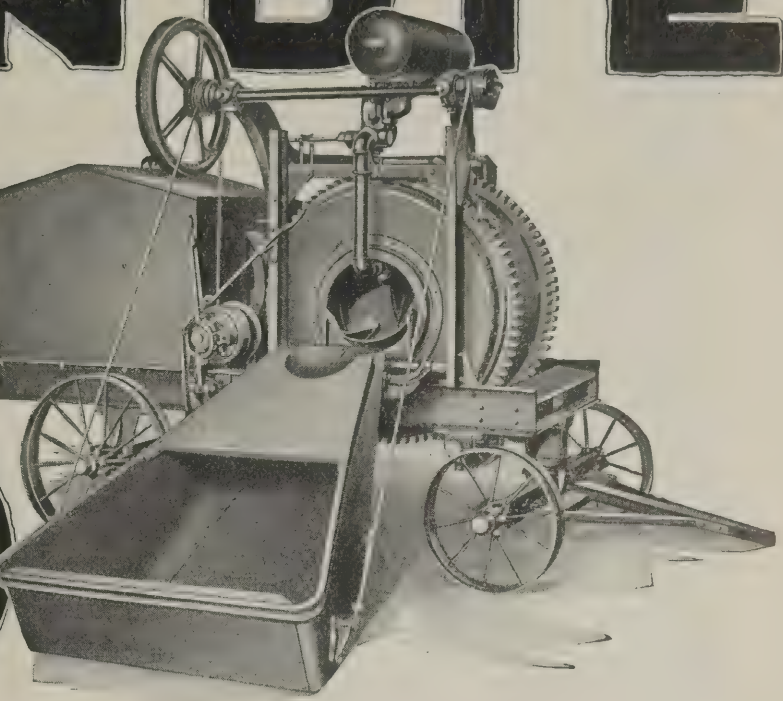
The United States Gypsum Company, in order to supply a plaster product for outside stucco, manufactures a material sold under the trade name of "Adamant Exterior Stucco." Strictly speaking, this cannot be regarded as a calcined gypsum product. It is a compounded material largely composed of white portland cement.

The principal factors entering into the hardness or density of calcined gypsum mixtures are the degree to which the gypsum has been calcined and the quantity of water used in mixing it before application. For equal quantities of mixing water "second settle" calcined gypsum yields a more dense product than "first settle" calcined gypsum. Gypsum whose calcination stops with the end of the first boiling stage is termed "first settle," and gypsum whose calcination stops with the end of the second boiling stage is termed "second settle."

Calcined gypsum used for structural purposes and subject to relatively high compression and shear stresses is usually a "second settle" product, which to obtain the highest structural values is mixed with about 34 per cent by weight of water. This quantity of water is not sufficient for the manipulation of plaster mixtures, and for this reason these high structural

DANDIE

The Big Value KOEHRING-BUILT Light Mixer



Sizes 4 and 7 cubic feet mixed concrete. May be equipped with low charging platform, charging skip or batch hopper, automatic water measuring tank and light duty hoist.

The Lowest Price You Can Afford to Pay

THERE are lighter mixers than the Dandie. There are cheaper mixers than the Dandie.

But the Dandie is as light as a *good* mixer should be built. And its price is the lowest for which such a mixer can be sold.

The Dandie is made by the largest makers of heavy duty mixers in America. Every economy of automatic machinery, standardized processes, and quantity production is reflected in its price.

In it is incorporated many of the features of the Koehring heavy duty mixers. It has the famous Koehring re-mixing action—the double gear drum drive—drum rollers keyed to shafts turning in big bearings.

Its cost is the ***lowest price you can afford to pay!*** It is not the cheapest mixer, but the reliable, money-making, long-service light mixer, at the extremely reasonable price which makes it the ***big value*** buy in the ***light mixer*** field.

KOEHRING MACHINE COMPANY

MILWAUKEE, WISCONSIN

MAIL COUPON TODAY ☞

Send back the coupon for the Dandie catalog. You do not obligate yourself in any way—it brings you money-making information about the money-making light mixer.

KOEHRING MACHINE CO.
Milwaukee, Wisconsin

Please send me Dandie Catalog No. F-3

Name ....

Address ....

values, due to the increase in density of the material, cannot be reached when considering plaster, and are not necessary.

Gypsum plaster can be hardened by reducing the quantity of water for mixing. A too large reduction in the quantity of water will yield an unworkable plaster. Because of these reasons gypsum plasters, after application, are not as dense as the structural product mixed with about 34 per cent of water, and even this dense product has an absorption of from 15 to 20 per cent.

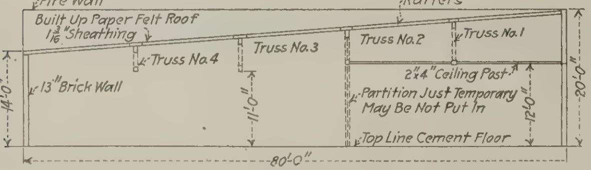
We do not recommend the use of gypsum plasters for outside, i. e., exposed constructions.

LAYING HOLLOW TILE TO RESIST CYCLONE ACTION.

Is there any reliable data, either from tests or from actual experience in some cyclone section of the country, showing which method of laying hollow tile would offer the greatest resistance to wind pressure? I would imagine that with the continuous bed joint and the better bond that can be had by the side or flat construction, such a wall would stand a much greater wind pressure than if the end construction was used. I have noticed some buildings of hollow tile that were to be stuccoed on the outside and plastered directly on the tile on the inside, where the tile were laid with only a bed joint and no vertical joint whatever, the contractors claiming that the plastering would fill these joints and make a better job. I disagree with that theory, but would be pleased to see something from the tile experts in the question columns along these ines—*W .H. W., Niagara Falls, N. Y.*

The method of laying the tile, whether end construction or side construction, is not a deciding factor as to whether the hollow tile wall will stand up when in the path of a cyclone or not. The nature of a cyclone or tornado is such as to cause an unequal disturbance of the atmosphere forming a pool of air, the vortex of which is a vacuum or partial vacuum. Any object that comes in the path of this cyclone is sucked up by reason of the fact that there is an atmospheric pressure of approximately 15 pounds to the square inch pushing against all objects, and when this atmospheric pressure is reduced on one side, the wall of the building naturally will be pushed or sucked into the vacuum. Now, the question of bond is not a deciding factor inasmuch as the entire wall will be drawn into this vortex. This, likewise, applies to all materials.

The theory has been advanced that in tile wall construction, where the cells run vertically in the wall, the horizontal joints should be a solid bed upon the webs and cells of the tile, while the vertical joints should be left unfilled. The reason for this is that in the horizontal joints there is no opportunity for conducting moisture from outside of the hollow tile wall to the inside of the wall through the mortar joints. And, of course, if there is no mortar in the vertical joints, it is impossible for moisture to work its way through the wall. In other words, the idea is to provide a moisture stop in the mortar joints. When the plastering is done both inside and outside directly upon the tile, these vertical joints are closed, which stops the passage of air, but are not entirely filled. Then, of course, a great deal depends on the faithfulness of the plastering contractor.



Cross-Section Garage
Showing Location of Proposed Trusses

TRUSSED AND FRAMED GIRDERS

I am contemplating building a garage 30x80 feet as shown in the attached sketch. The dimensions given and the slope of the roof are more or less fixed because I am building alongside of another building. I want to put in four trusses of wood, spaced 15 feet 7 inches apart. Of course, these must run across the building and the rafters will then run lengthwise. I do not want any supports in the center and if possible, I want to use 2-inch by 8-inch material, 16 feet long, because I have a lot of that on hand. I intend to have a composition roof and you may allow a snow load of 30 lb. per sq. ft. You will note that the rear trusses may be dropped one foot lower than the other two. I would like to have you tell me what sort of a truss would be best and cheapest for me.—*C. J. T., Ironton, Mo.*

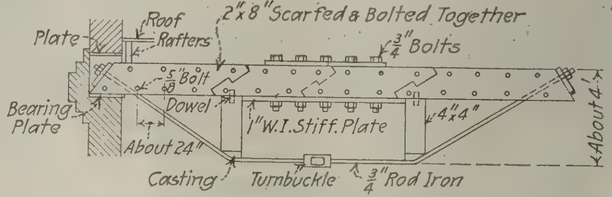


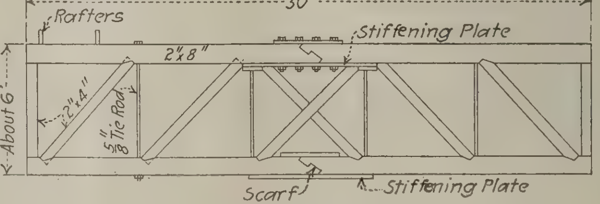
FIG.1

Suggestion for Shallow Trusses

We believe you can build a trussed girder as shown in the illustration, from the material you have on hand at a small cost and at the same time use a considerable amount of it. The trussed girder will be better for your purpose than a framed girder and it will be easier and cheaper to build.

We would suggest scarfing the pieces of 2x8 as shown, and bolting two pieces together for the girders. The W. I. plate in the center is for stiffness to reinforce the scarfed joint on the one side of the girder. The posts will serve this purpose at the scarfed joints on the other side.

You may wish to use a framed girder for the two front supports. In that event, we are showing a sketch of how you could do this and still make use of your 2-inch by 8-inch material.



Frame Girder
FIG.2

Construction of Front Trusses
Truss in Fig. 1 May Also Be Used

Kodak Keeps the Record

And on every negative the indisputable autographic date and title, made *at the time.*

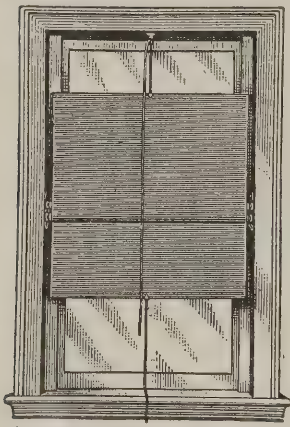
Catalogue at your dealer's, or by mail.

EASTMAN KODAK COMPANY, ROCHESTER, N.Y., *The Kodak City.*

New Devices of Interest to Builders

Correct Light and Proper Ventilation for Public Buildings

Unusual care should be exercised in the selection of window shades for such public buildings as schools and hospitals, where the color of the window shades and the method of hanging have much to do with the comfort of the school child or the convalescent patient. It is a recognized fact that certain colors of window shades in schoolrooms cause eyestrain and headaches. Chemists have made a study of this for the Stewart Hartshorn Company, 250 Fifth Avenue, New York City, and have devised two colors in tinted cambric shade cloth which are being used extensively by boards of education in schools throughout the country. In hospitals and sanitariums where it is necessary to darken rooms for the comfort of the patient, dark green or brown should be used.


An Excellent Arrangement of Shades for School Rooms, as Well as Many Other Buildings.

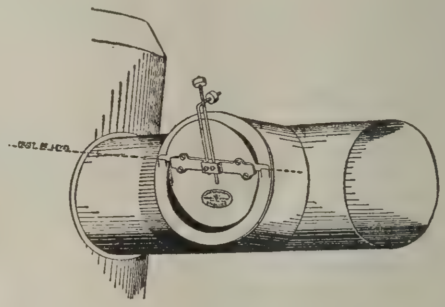
Control of ventilation can be secured by placing two shades at the center of the windows, as shown in the accompanying illustration. When the window is opened from the top the glare is shut out by the lower shade, and if the window is open at the bottom the upper shade is raised. Two short shades at the center of a window hang straight and smooth, roll evenly and wear much longer than one shade covering the whole window. The increased length of life of the two short shades is worth considering for buildings where they are subjected to very hard usage, such as schools and auditoriums.

A Draft Stabilizer as a Coal Saver

One of the coal saving devices receiving considerable attention at this season is the vapor Vacuum Draft "Stabilizer" shown in the accompanying illustration.

This is suited for any type of heater, and is designed to maintain a steady draft over the fuel. It acts as a swinging check and is so balanced that it counteracts any variation or sudden changes in the draft, thus insuring a uniform condition in the fire chamber of the heater, so the manufacturers claim.

This stabilizer is attached by fitting it on the side opening of a T-joint placed in the smoke-pipe, as near the heater as possible. It is attached so that it stands in a vertical position and the weights are adjusted so that it will swing out or in on the least variation of draft.



It is manufactured by the Vapor Vacuum Heating Co., 112 S. Sixteenth Street, Philadelphia, Pa., who make the claim that it will save over 20 per cent. of the fuel. This firm is prepared to back up their claim by selling the device with a "money back" guarantee. In other words, they agree to refund any money paid for this device if after a ten days' trial it does not do what the manufacturer states it will do.

Now It Is Zinc for Roofing Nails

In line with the movement "To Make It of Zinc" comes the zinc nail, and, as indicating its progressiveness, the Berger Brothers Co., Philadelphia, Pa., is the first to bring this nail to the attention of readers.

This company has recently issued a circular calling attention to the advantages of the zinc nail, among which it has enumerated the following: It does not rust; is exceptionally durable; cheaper per pound than copper, 25 per cent. more to the pound, and does not stain.

The Berger Brothers Co. became distributor for one of the large manufacturers of zinc after making an exhaustive investigation of the subject, and consequently is in position to give complete information on the subject to readers who may be interested in investigating the subject of the zinc nail.

640.54
CB

MARCH 1921

Arch.

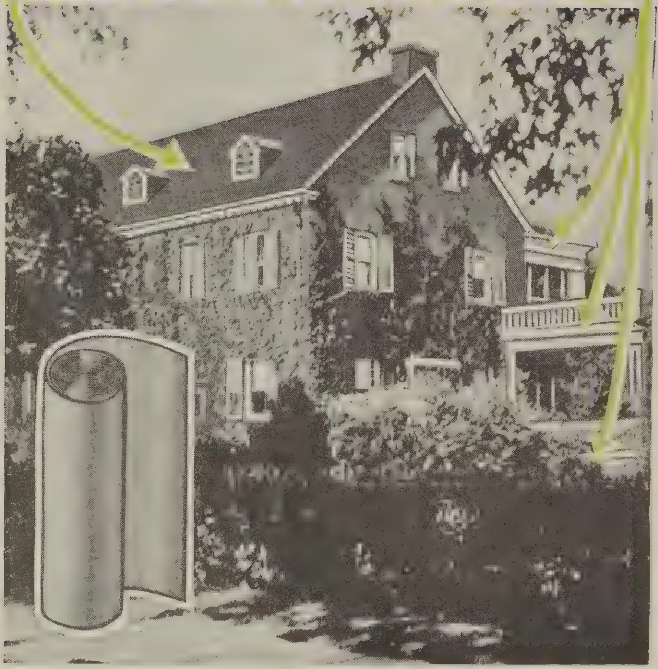
Building Age

UNIVERSITY OF ILLINOIS LIBRARY

Vol. XLIII No.3

Price 25 Cents

CON-SER-TEX
FOR
ROOFS AND PORCH FLOORS



THE IDEAL ROOFING

For Porch Floors, Sun Parlors, Sleeping Balconies, and all flat surfaces,

Wherever a durable flashing or a lining for a wood box gutter is required—

Wherever an economical, durable, attractive covering is needed—

Con-ser-tex Canvas Roofing will give satisfaction. It's a chemically treated heavy cotton fabric which will not crack, stretch, shrink, curl or peel. It's easy to lay and profitable.

Our Free Booklet, "Roofing Facts and Figures" illustrates and explains the many uses and advantages of Con-ser-tex.

WM. L. BARREL CO.
8 Thomas Street
New York City

Chicago Distributors:
Geo. B. Carpenter & Co.
430-440 North Wells St.

California Distributors:
Waterhouse-Wilcox Co.
San Francisco & Los Angeles

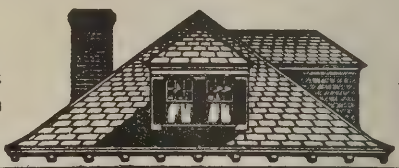
FLOORS
The Wood-Mosaic Kind

For every home—Old or New. Can be installed by your mechanics. Our 5/16″ flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood Carpet, strips Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalogue in natural wood colors.

Wood-Mosaic Company
New Albany, Indiana



REX
ROOFING
PRODUCTS

Manufactured to fill every need of a roof-covering in any climate and by a manufacturing concern whose policies are shaped to be "right" from every point of view.

THE FLINTKOTE
COMPANY, INC
BOSTON, MASS
NEW YORK, CHICAGO
NEW ORLEANS

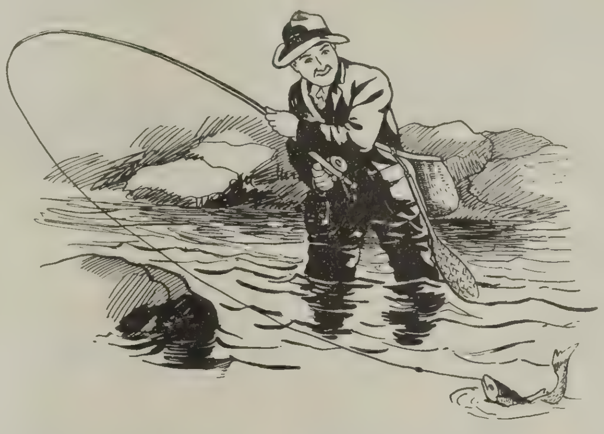
BUILDING AGE

New York, March, 1921

Landing the Job

FISHING is probably the greatest outdoor sport in the world. Why is it so fascinating? Why will a man wade to his knees upstream, never tiring all day and always expecting the familiar tug on his line that indicates a "strike?" It is because he loves the sport.

He has probably spent days in preparation, in selecting his bait, in testing his tackle. He has devoured every bit of fisherman's gossip and knows just where the fish are running and on what they are biting. And when he gets his "strike" he knows his days of preparation have been rewarded.

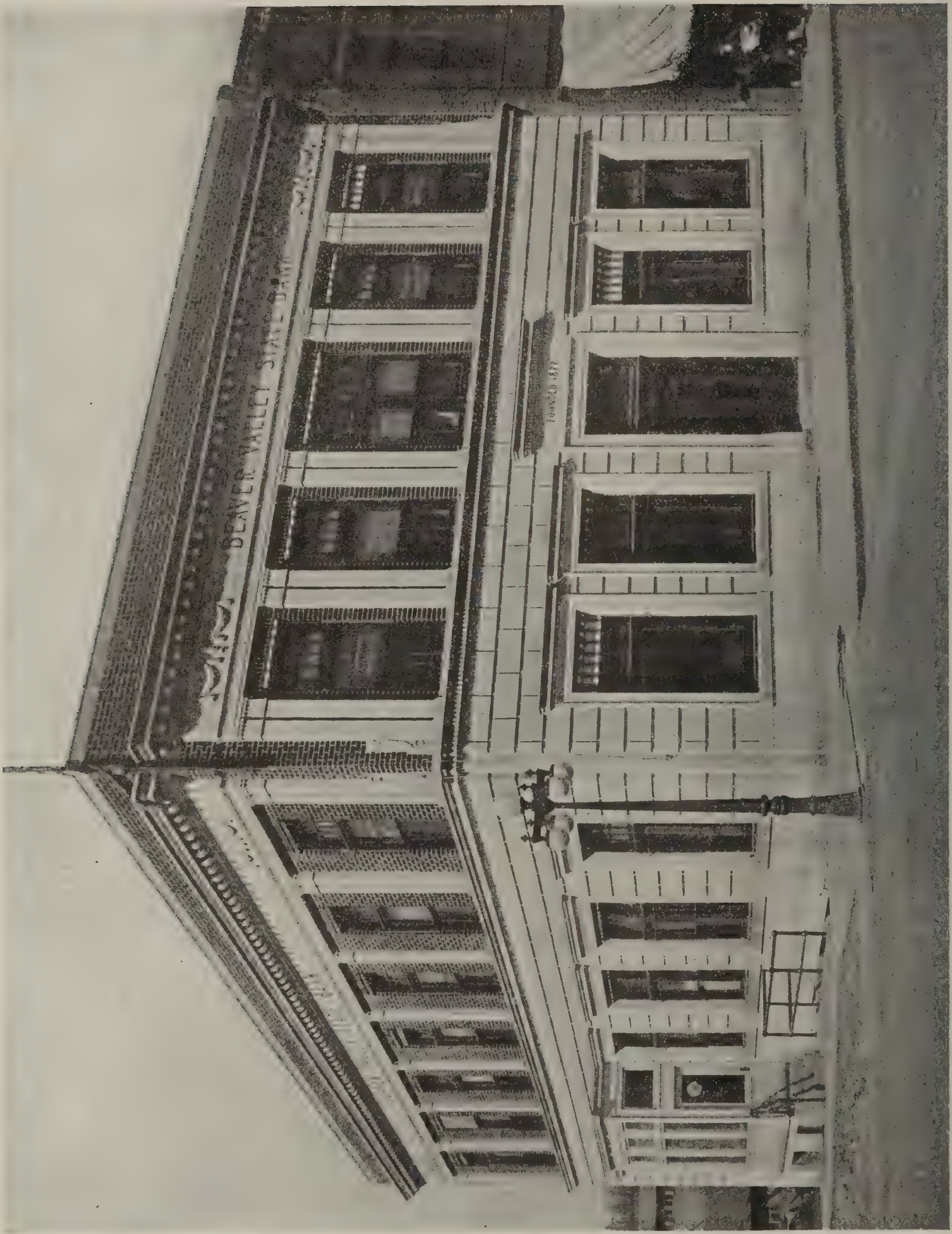


But it is a long way from the brook to the basket. The line is taut, the pole bends and the reel sings. The real sport has begun—landing the fish. Action is needed, but it must be the careful, intelligent action of the experienced fisherman. There must be no slack line as the trout darts back and forth through the water. At length he realizes that the fisherman is master of the situation and the game is over.

In landing a job the builder and contractor have a proposition similar to the fisherman's. Getting a live prospect is like getting a "strike." It means months of careful preparation, keeping in close touch with possible future owners, knowing where to direct the real efforts, using the right kind of bait, and having every unit of the organization fit and in readiness so that when the "strike" comes, the new client will get plenty of the kind of action that will make him want to put his name on the dotted line.

There is going to be increased building activity in the near future. The live contractor is already looking around his organization to see if everything is in preparation to handle the work that will come. He is getting a line on who are thinking of building by reading the papers, and by keeping in close contact with the social and business world. By well directed missionary work he is letting these people know that he can do their work right because he has built a reputation by doing things right. He is establishing their confidence in him and is keeping his name before them.

He knows that competition will be keen, that if he wants the work he will have to go out and get it. He knows that now is the time to get on the job and stay on the job.



BEAVER VALLEY STATE BANK, PARKERSBURG, IOWA
A. Moorman & Co., Architects and Builders

Why Build Houses To Be Burned Up?

Architects and Builders Should Give More Attention to the Fire Hazard—Tenants Should Use More Care—Suggestions for Home Builders

FIRE.

During the past five years it has destroyed property valued at $1,416,375,845, nearly one and one-half billion dollars. This amount of money would build four Panama Canals; it would build 250,000 homes today—homes that would house 1,250,000 people or more than the population of the entire state of Connecticut.

This money represents wealth in labor and materials that could have been preserved but has been destroyed because of improper design or carelessness of individuals. Insurance companies, underwriters and safety agencies are doing excellent work in educating engineers, architects and the general public about fire and its prevention, but there is still a big job ahead of them and BUILDING AGE feels that the press of the country should lend a hand.

> **"I would have, then, our ordinary dwelling houses BUILT TO LAST, and built to be lovely; as rich and full of pleasantness as may be within and without, and with such differences as might suit and express each man's character and occupation and partly his history."**
>
> **—Ruskin.**

The records of the National Board of Fire Underwriters show that the chief cause of fires is electricity and this is closely followed by smoking and matches that have been thrown away while they were still glowing. In the order of their importance the principal causes of fire are given as follows:

Electricity	$84,086,470
Smoking and Matches	73,474,348
Defective Chimneys	56,650,915
Stoves, Furnaces, Boilers	55,133,181
Spontaneous Combustion	49,702,886
Lightning	39,828,489
Sparks on Roofs	29,271,585
Gasolene, Kerosene, etc.	25,910,434
Fireworks	1,499,854

Improper wiring and defective insulation are the main causes of electrical fires. There are many cases where buildings and houses are rewired or wired in a temporary way by incompetent persons, without proper inspection. The practice of allowing tenants to do temporary wiring and install electrical devices themselves should be discouraged. All electrical work should be done by competent electricians and then should be inspected by the proper authorities.

Careless use of matches and smoking are matters largely up to each individual, but it is of great importance. Your tenants are not finished with your pipe, and the housewife is not finished with your match until you have actually smothered the smoldering remains. It may seem fussy and unnecessary, but if you will look upon the smothering of a match as a part of the operation of using it, you will develop a habit that will prevent more than 14,000,000 dollars' worth of fires a year.

The matter of chimneys is something for the architect and builder to take to heart. If you will follow the specifications of the National Board of Fire Underwriters regardless of your state or city laws, you will not go wrong. They are generally safer and surer than any local legislation because they have been prepared by experts. In general, it is advisable to run up chimneys entirely exposed instead of enclosing them in the walls of the house. Defects do not appear in chimneys until long after they are built, and if they are enclosed these defects are generally not discovered until it is too late.

Fires from overheated stoves are generally laid to a careless housewife, but the fact remains that an overheated stove will not cause a fire if there is nothing burnable near it. Woodwork around a stove should be avoided and walls behind a stove should be well insulated from the radiant heat. It is well to build such walls to a height of 5 or 6 feet of tile or brick. Metal lath and plaster may then easily be applied to the surface if desired. Under the stove lay a mat of granolithic concrete 2 inches thick instead of the flooring and place a thin sheet of metal between the mat and the under floor. Light wire reinforcement should be placed in the mat.

Spontaneous combustion takes place when the air is filled with explosive fumes, finely divided dust or in rubbish piles of oily waste and like materials. It never occurs in well ventilated places because the air would carry away the heat made by the slow oxidation of inflammable materials as fast as it was made.

An Example of Rural Chimney Construction that Needs no Comment.

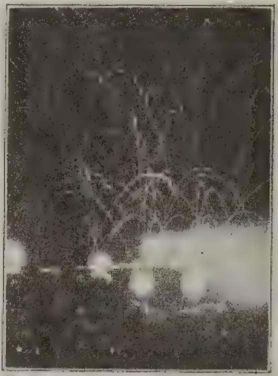


Photo by Brown Bros.

Ornamental but Highly Dangerous Unless Properly Safeguarded.

Photo by courtesy Jay W. Stevens

Hot Ashes and a Wooden Barrel Make a Dangerous Combination.

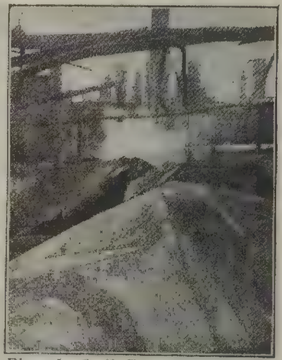


Photo by O. F. Browning.

Proper Oil Tank Construction would Prevent Such Damage.

What Sparks Will Do to Inflammable Roofs.

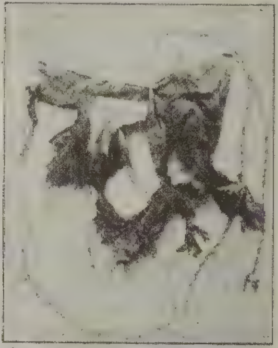


Photo by courtesy J. W. Stevens

An Electric Warming Pad That Produced Too Much Heat.

Photo by courtesy Jay W. Stevens

This "Fireless" Cooker Caused a Fire.

Photo by courtesy N.Y. Fire Dept.

Beware of Gas Brackets Near Window Curtains.

Photo by courtesy Nat. Automatic Sprinkler Assn.

Where 173 School Children Were Burned to Death in a Fire Caused by an Overheated Steam Main.

Photo by courtesy N. F. P. A.

Locomotive Sparks Ignited and Destroyed this 7,800 Cord Pile of Pulp Wood.

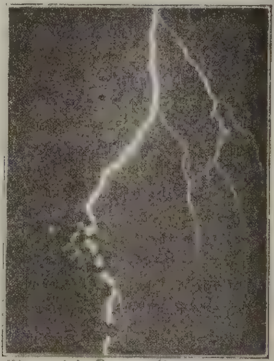


Photo (c) Brown Brothers

Lightning "Caught In the Act."

Burning Grease Starts Many Fires

Don't Let These Things Happen in Your Houses

Keep cellars, closets and attics ventilated and do not allow piles of rubbish to accumulate.

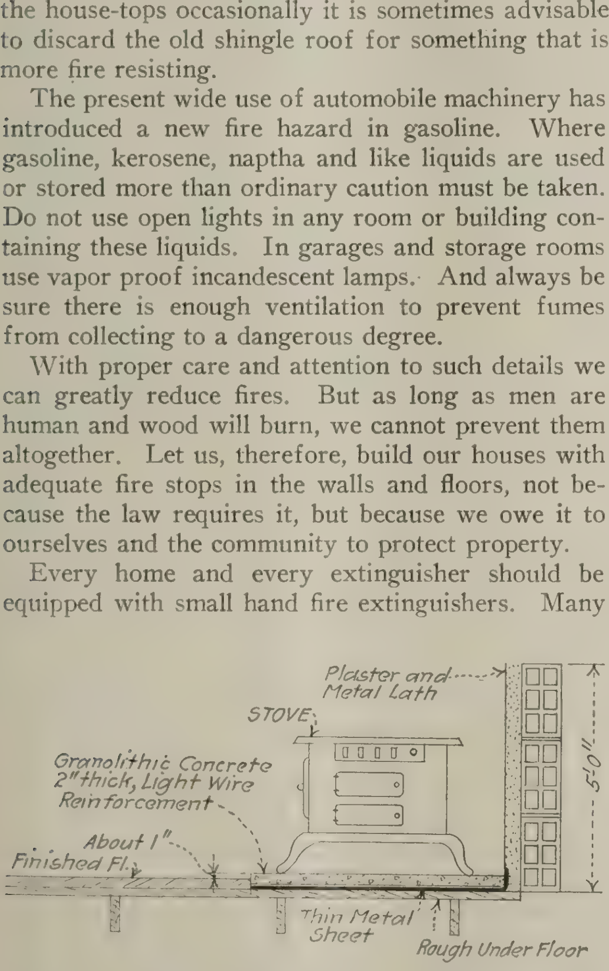
Lightning rods are an old story. The methods and practices of the old-time lightning rod agent have thrown a lot of discredit upon him and his goods. But the fact holds that in localities subject to severe lightning storms, properly designed and correctly installed lightning rod equipment *will* prevent fires from this cause. Lightning rods, therefore, are still a good insurance against fire in spite of the disrepute into which they have fallen.

There are many forms of roofing today that give good service and also have considerable fire-resisting quality in their compositions. The majority of such roofs are more fireproof than wood and in localities where sparks may be expected to drop on the house-tops occasionally it is sometimes advisable to discard the old shingle roof for something that is more fire resisting.

The present wide use of automobile machinery has introduced a new fire hazard in gasoline. Where gasoline, kerosene, naptha and like liquids are used or stored more than ordinary caution must be taken. Do not use open lights in any room or building containing these liquids. In garages and storage rooms use vapor proof incandescent lamps. And always be sure there is enough ventilation to prevent fumes from collecting to a dangerous degree.

With proper care and attention to such details we can greatly reduce fires. But as long as men are human and wood will burn, we cannot prevent them altogether. Let us, therefore, build our houses with adequate fire stops in the walls and floors, not because the law requires it, but because we owe it to ourselves and the community to protect property.

Every home and every extinguisher should be equipped with small hand fire extinguishers. Many small fires have been nipped in the bud because a small extinguisher was handy. In the garage, hang up sand pails for use when gasoline or oil takes fire. It is useless to try to put out an oil fire with water. Think about these things and do them and we will have fewer fires.



Method of Fireproofing a Stove

Exposed chimneys are safe and can be made attractive

Defects are quickly detected

Educational Opportunities

BEGINNING February 9, during the coming semester, the New School for Social Research has arranged to hold a conference once every month between engineers and economists on the subject of *The Function of the Engineer in the Social Structure*. These conferences, which will be held at the Auditorium of the New School, 469 West 23d Street, New York City, will consist of addresses, lectures and open discussions by engineers and economists on the responsibility, opportunity and function of the trained technician and economist in the social structure. The problems of production, labor, waste, industrial morale and efficiency together with the underlying economics will be discussed.

THE School of Forestry of the University of Idaho at Moscow offers a correspondence course in Lumber and Its Uses. That the course is meeting a real need is attested by the large number of students that have registered for it since it was first announced about three years ago. Some thirty different states are represented in the enrollment.

The course is designed to be of special value to lumber dealers, lumber salesmen, contractors or builders, carpenters, manual training teachers, and others connected with the wood working industries. The fee is a nominal one and includes the text book and all reference material.

The course consists of twelve assignments covering such topics as the structure and physical properties of wood, lumber grading, structural timbers, seasoning and preservation of wood, lumber production and the selection and use of materials.

A prospectus will be sent on application to the School of Forestry, University of Idaho, Moscow, Idaho.

Better Building Methods

When Prices of Material and Labor Are High It Is Necessary to Take Advantage of Every Possible Way to Cut Down the Waste in Production of Every Kind

By Lawrence S. Keir

PART I

IN figuring the cost of a building some consideration should be given to the upkeep after the building has been completed and is in use. Sometimes what would at the start appear to be a saving in cost proves after several years to be an expense. For example, suppose a house built of material requiring frequent painting would cost $10,000, and for a slightly higher price the house could be built of materials requiring much less attention in this respect. In ten years' time the more expensive house would actually have saved the owner money. It is not advisable, therefore, to cut down on the quality of material, but to see that all material is used to best advantage.

Furthermore, the building industry is behind in output; prices are high and when building once starts in earnest, there will be a shortage of material and labor. Therefore, we must waste neither material nor labor. We must produce if prices are ever to become stable again.

Considerable Savings Possible

Experience and observation have shown that many a dollar can be saved in building construction by cutting out waste and by more efficient methods in the handling of material and labor. The kinks mentioned in this article are not new. Many readers have probably made use of some or all of the ideas mentioned and some of them perhaps will have even better ones, but Building Age *is* always glad to hear from any one who has something to say about saving time or labor.

Several times recently the statement has been made that wages have doubled, and the output per man has gone down 50 per cent. If this is the case the best way to cut expenses is to get more output from each dollar's worth of labor and cut out the waste. To get more work out of a man, it is not necessary to work him harder. If he is simply lazy, just let him go—the sooner the better. But first give him a chance to work in comfort. Give him proper tools to work with. Make it handy for him to get at his work and he can hardly help turning out more. Nearly every man is pleased when he has turned in a good day's work and is encouraged to try again the next day. One or two lazy men will sometimes slow down a whole crew because the other men lose heart in trying to make a showing. The further they slip back in their output the more dissatisfied they become. But once let a gang of men get the idea that they can do more and better work than any other gang can do and it's going to take a pretty good fight to beat them. If the boss will do his share of the planning, the gang will be more apt to do their share of the labor. A boss's duty does not require him to drive the men and shout at them as many appear to believe, but he should be on the lookout for kinks to make the labor easier, and quicker—not so much to make the men work harder, but to better advantage.

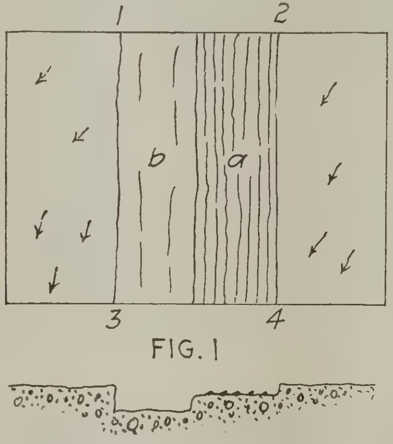


FIG. 1

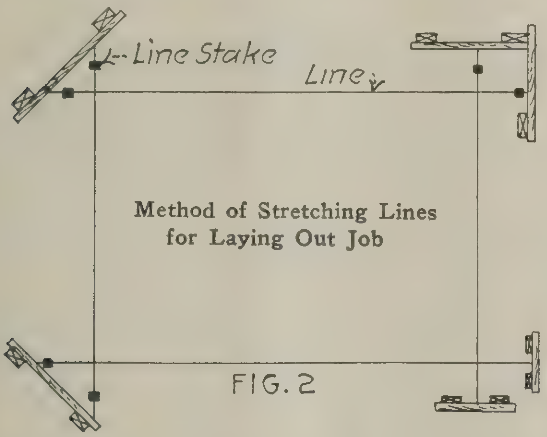
Method of Breaking Ground

A few years ago in a small city of New York State a town hall was being built. It was a rather pretentious building for a city of not more than two thousand people. The building was only two stories high, but covered considerable ground. It was necessary to dig the basement to a depth of eight feet and the earth had to be carted from the premises. The lot was level and no bedrock was encountered. While the work was going on the observer was impressed with the feeling that not a man on the job had any definite idea of what he was trying to do except put in his time.

This is how they went about it.

Two teams plowed the entire surface of the excavation and several feet beyond it, for in the general mix-up there was no way of keeping a line in place. Wherever the plows left a ridge, men with picks loosened it up. The teams that were carting away the dirt drove on the lot wherever they could get a full load. The laborers dropped their picks and shoveled dirt into the wagon. In the meantime men and teams had trampled down much of the dirt that had been dug up.

When the excavation was a few feet deep conditions got worse. Men were trying to work and dodge teams at the same time. Some men were rolling stones up the bank to get them out of the way. Wagon drivers jumped their carts into the hole wherever they thought they could make it without breaking their necks or losing a few wheelbarrow loads of dirt in the scramble to get out again. In the meantime cart teams and plow teams were continually dodging each other. Fortunately, they didn't get a hard rain or they would have been swamped because no provision had been for pumping out the water and for draining it off. The work was being done by a man who had made a fair little nest egg for himself in the mason contracting business, but this job broke him. Where all his profits went to is a mystery, but some of them were trampled under foot, ran away from him while he was dodging teams, or wore themselves out climbing in and out of that excavation. Considerable time and energy might have been saved by going at the job with some sort of system.



Method of Stretching Lines for Laying Out Job

FIG. 2

Suppose Fig. 1 to be the lot that is being excavated. Start with a strip 1-2-3-4 a little more than twice the width of a wagon. Break loose half this strip *a*. Drive along the strip *b* with the carts until the loose earth on strip *a* has been removed. Then reverse the operation and loosen up a layer of earth at *b*, driving along the strip *a*. The strips can be extended a little beyond the building line if necessary to ease the grade as the excavation deepens. On a large excavation job two separate sections should be under way so that while the earth is being carted from one section, the other section is being loosened up. Continue in this way until the bottom level is reached, leaving a slope at each end to drive in and out. Keep the carts moving in one direction only.

If the soil is fairly easy to break up a plow will pay. But if the soil is fairly tough, it may be more profitable to use dynamite, putting in one-half or one-third of a stick in holes about 18 inches deep and 5 feet apart. For safety, fire one blast at a time. It seldom pays to loosen earth with a pick because no man can loosen earth in an open excavation as cheaply as it can be done by the use of dynamite. Blasts can be covered with plank or log mats to prevent pieces from flying and if the blasting can be done during noon hour and after working hours, it will save time and be safer. The earth should not be removed to too great a depth as the distance to the wagon will be too high for shoveling.

ADVANTAGES OF THIS METHOD

After the bottom level of the excavation is reached the earth at each side of the driveway may be loosened by undermining, either picking or blasting. This saves a lot of picking to loosen the top earth.

The advantages of the above method are as follows:

1. The loosened earth is not packed down again after it has been loosened, although a large gang of men and teams are working.
2. In case of rain there is less water to be pumped out.
3. Men and teams are not in each other's way and there is a chance to keep tabs on the work and to see what progress is being made.
4. Large chunks of earth may be loosened by simply letting them fall in.
5. The wagons have solid ground to run on.
6. The loose earth is always handy to the wagon.

In case of an excavation on a side hill, the easiest way, if it can be arranged, is to start digging at the lowest point and, keeping the floor level, work back into the bank. Then, if wagons are used the loading is from the uphill side and if scrapers are used the haul is down grade. Sometimes it pays to have two wagons to each team of horses so that one wagon may be loaded while the other one is being carted away.

CAREFUL PLANNING NECESSARY

On any job, take time to look around and plan what you are going to do before starting to work. In laying out the lines carefully be sure they are correct. Stakes driven in at the corners are not satisfactory. They will be dug loose sooner or later. A good plan is to put up line boards (Fig. 2), keeping them somewhat back of the excavation. Beneath these boards and directly under the lines, drive 2" x 2" stakes flush with the ground and drive a nail home in each stake so that only the head is in sight and on the exact line. This takes only a short time to do and may save costly mistakes later on. If the line boards are disturbed a few minutes' work will locate them again, but there is little chance of the boards being displaced by careless workmen without your knowing it. This method also saves relocating the lines for the foundation work.

Frequently the excavated earth is wanted somewhere on the premises for grading. Where the earth is to be used nearby a team and scraper is usually cheaper than wagons or wheelbarrows. A wheelbarrow is good if used in the right place but it seldom pays to move earth with a wheelbarrow.

If earth is to be removed from the lot it should not be handled more than once. In trench work this is not so easily done, but usually the earth can be carted away before it has a chance to settle or is tramped down and requires loosening up again before it can be handled.

Don't dig trenches so narrow that a man is cramped for working room unless they are shallow or unusual conditions make it necessary. The added ease of working in a space large enough will more than pay for the extra earth removed. When a man works he moves. If he can't move he can't work. Trench work can be done with a plow for the first foot or two and in wide trenches a scraper can sometimes be used to advantage. Much unnecessary inconvenience can be avoided by placing loose earth as far as possible out of the way and by placing it where it need not be moved again.

Large stones can be moved more easily by a stone drag than by a wagon. A scraper handles stones with no labor at all to load and unload. If there are stones or planks or stumps in the way it will pay to remove them as they will have to be moved some time anyway.

If the roadway is in a position that makes it necessary to shovel considerable dirt from the low side into the wagon, a few hours' work will change the road to the lower side of the work. The time lost in building the new road will soon be made up and the men will be saved a lot of hard pitching. Time is usually well spent in leveling up a road where much hauling is to be done. If men must work against all sorts of obstacles, they can't turn in much work.

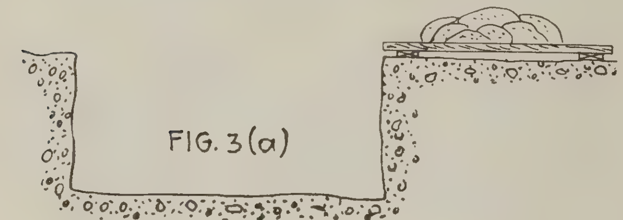


FIG. 3(a)

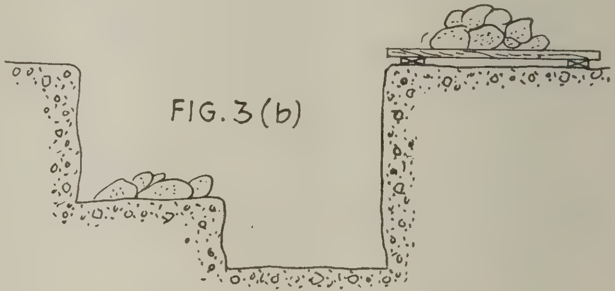


FIG. 3(b)

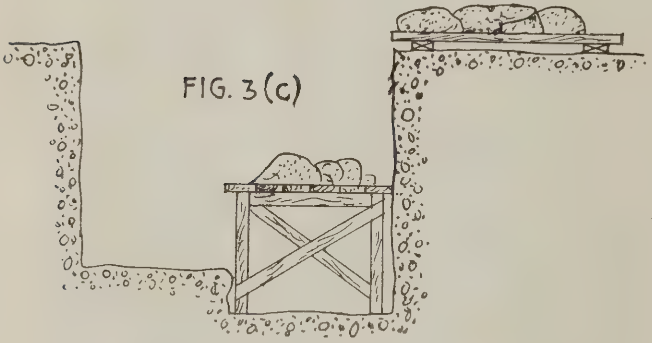


FIG. 3(c)

Making it easy to remove dirt as excavation deepens

On deep excavations where the dirt is to be removed from the premises, it will pay to shovel the dirt onto a plank platform and from there into the cart. A man can shovel enough dirt from an evenly laid plank platform to more than pay for the platform. Where benches must be left in the excavation so that the dirt can be passed up by stages, these benches should also be planked.

In handling a job of this kind, Fig. 3a shows how the earth has been removed by shoveling onto the platform. In Fig. 3b the earth has been shoveled to the first bench and from there to the top. In Fig. 3c a staging has been put in to form a shoveling platform while the earth that formed the first bench is being removed. Where power shovels or other machinery is not used this method proves comparatively economical.

The platforms should be about 12 feet long by 8 feet wide (depending on conditions) nailed to stout battens. They should be strong but not so heavy that the men can't move them easily. They are placed so that the men shovel the long way of the planks.

A quarry superintendent who has had over thirty years' experience in Scotland and the United States expressed his surprise in the way rock was sometimes excavated even in large cities like New

York. He estimates that many of these jobs cost from 25 to 35 per cent. more than necessary, simply because no advantage has been taken of the natural lay of the rock.

From Fig. 4, it is evident that if the rock on the side *a* is removed first or even if the whole excavation is carried down evenly, the various pieces will bend. On the other hand if the rock is removed in layers starting at *b* and following the natural beds of rock, most of the material can be wedged out with plugs and will free itself naturally after a few pieces of each layer have been removed. The advantages of wedging is that it avoids blasting and the large amount of small chips and rubbish caused by blasting. When the pieces are wedged out, they are mostly in sizes that can be handled to advantage. Less confusion is caused and the work is more orderly.

Shale or slate can be removed rapidly if it lies in horizontal beds, by taking it up in layers. In shallow cellar excavations, solid shale running in hard layers can be removed faster than earth because large units are removed at a time. Where the shale stands on edge a pick is of little use. The easiest way is to blast it out from underneath. It can easily be gotten out this way after getting to the bottom in one corner. Hardpan should be drilled and blasted even for a small cellar. No headway at all can be made with hand picks.

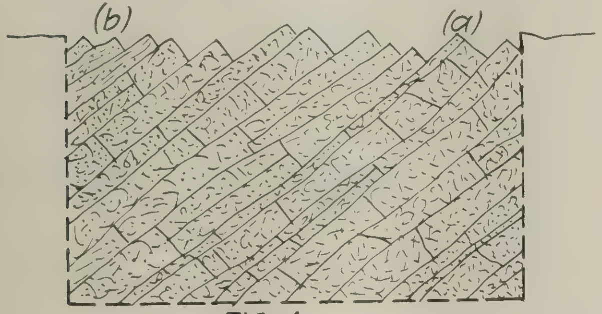


FIG. 4

When rock lies in strata formation its removal can be made easy

When excavating during freezing weather it is a good plan each night to leave a layer of loose earth 4 or 5 inches thick over the surface being excavated. This protects the solid ground beneath from freezing and if the loose earth freezes, it does not take much effort to dig it up again.

When ground is frozen deeply undermine the frozen dirt from below the frost line and then break it out with a pick or crowbar or with bar and sledge. In some cases steam can be used under the frozen ground. Sometimes if the excavation is of considerable size, the whole face may be undermined and then blasted out in a long strip. When this is done the last blasting should be left to protect the unfrozen ground over night.

If you expect to get work out of your men, keep them comfortable. Don't let them work in mud when a little forethought and planning can do away with the water. Provide plenty of good hand tools of a size and shape that they can handle to advantage. Always keep the tools sharp and in good shape. Men will move a full shovel of earth more easily with a good shovel than a part shovelful with a poor shovel. This applies equally well to all tools. Only a short time is required, working with poor tools, to lose the price of new ones. Poor tools are, therefore, a continual drain on the profits and cause dissatisfaction among the men.

Supply Proper Tools

Furthermore tools should be of good quality and not so big and heavy that they unnecessarily add to the burden of the work required of them. When men get tired they slow down and instead of doing as much as possible in a day, they work hard the first few hours, only to lose what gain has been made before the day is over and then go home fagged out.

Keep the premises in order. Pick up everything not in use. See that the men have room to work freely. Use care in placing your men on the job, finding out what each man can do best. If a man shows aptness in some particular line, give him that work as far as possible. Don't change the men around too much. If they are kept on one part of the work they soon get to think of it as their particular job and take pride in it accordingly. Of course, no man likes to get all the mean work on the job, but frequently what one man considers a mean job is not considered that way by another. Always see that toilet conveniences are provided and insist that they be kept clean. Supply plenty of good drinking water and provide a comfortable place where the men can eat their lunches. On cold days, a warm place in which to eat puts new cheer in the men and helps them start the last half of the day with renewed courage. In severe weather a can of good hot coffee in the middle of the morning and again in the middle of the afternoon is appreciated and it costs little. Go to work promptly and quit just as promptly. Pay fully and promptly.

Show an Interest in the Men

Always lend a willing hand at any particularly heavy or disagreeable task and take a personal, but not condescending interest in each man. Be one of the boys and let the men work with you and not for you.

Don't do all the telling, but give the men half a chance to tell you. Many a good suggestion gets across because the men are not afraid of the boss. Be open-minded.

If the men like you and respect you, they will see you through many a tight place where another fellow's men would quit. The boss who builds up a reliable gang of men who know they in turn can depend on their boss, has something that money can't buy. He knows his men are with him and his labor estimates are not all guess.

A few years ago on a big subway job the water broke into a section of the underground work and threatened in a few hours to destroy the work of weeks. The boss could not persuade any of his men on this section to go in and try to stop the leak. Finally one of his foreman volunteered to tackle the job. This foreman called his gang together, told them the circumstances and asked how many would go in with him. His whole gang went and they stopped the leak, but if he had ordered the men to go in and do so and so, he would have had no better success than his boss. Men cannot be driven like cattle.

Today many large manufacturers give a bonus on the work turned out. Something of this kind might be worked out on a big job. It has been tried with success on small jobs, the men getting so much a yard for excavating. If this is done *fairly,* the men can gain a couple of hours and it is generally appreciated. The offer of a bonus to the men if the work is finished by a certain date often works well and everybody gains by it.

In apportioning work be honest. Don't try to put something over on the men. Stand back of the square deal. *A day's work for a day's pay—no more and no less.*

Concrete

In concreting much is to be gained by having ample room in which to work. Before the job is started the layout of the work should be decided upon. Where is the bulk of the concrete to be placed? Where will the sand, stone, cement be stored? These materials must be handy for the men and for the teams. Arrange so that the wagon path will not have to be crossed continually by the workmen. Plan the runways. Give the carpenters room to work on the forms. If a mixer is to be used, lay things out so that it can be moved from place to place without moving something else first. Plan for a water line to the engine and mixer without having it in the way. Allow for bringing up fuel.

Before placing any materials it is well to level up the premises a little. It is unwise to wheel concrete around dirt heaps and to climb over them while working, especially if the dirt must be moved sooner or later anyway. Do it now. Arrange to have the wagons deliver their material and move on without blocking anything up.

Keep enough material on hand to tide over a delay in delivery, but not too much, or it will be in the way. Have the materials deposited near where they are to be used, always considering general convenience.

Provide rough bins for sand and fuel, or they will be trampled all over the place. Have a good power plant, a good mixer and take care of them. It costs something to tie up ten or twenty men while you make a temporary repair on machinery. A machine that is worn out requires a pretty well-to-do man to keep it going. If he wants to keep it on the job for old times' sake and can afford to do so, all right, but most of us can't afford it.

Don't be too quick about moving the mixer. Frequently where only a small quantity of concrete is needed somewhere along the line, it pays to place a platform there and do a little hand mixing even when there is a power mixer on the job. This is especially true when the concrete is to be placed some distance from the mixer. Dry materials are moved more easily than wet concrete. If it is known beforehand that the mixer is to be moved from time to time, set it on planks so that it does not settle into the ground and require extra work to get it started out. This applies also to the engine.

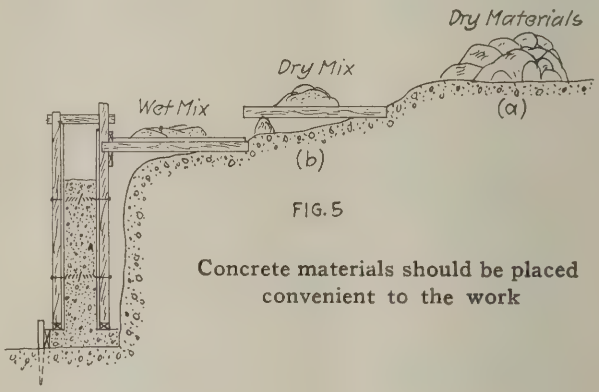


FIG. 5

Concrete materials should be placed convenient to the work

If it can be done conveniently, place the mixer at a point where the greatest amount of concrete can be delivered directly from the mixer into the forms or into chutes leading from the mixer to the forms. In some cases the mixer can be elevated to advantage. Do away with rehandling as much as possible.

Runways and platforms should be amply wide and the runways should be no steeper than necessary. Where concrete must be wheeled along the ground in barrows, lay down planks over which the wheeling can be done. A width of two planks is just twice as good as one. Fasten them to battens laid beneath and they will not spread apart.

Platforms for hand mixing are best placed at a point where the concrete can be shoveled directly from the boards into the forms or into chutes. A large platform will allow for mixing a fresh batch on one end of the board while mixed concrete on the other end is being shoveled into the forms. The board will be moved along as the form is filled.

PLACE DRY MATERIALS AT ONE SIDE

Dry materials placed at the ends of the board make it more difficult to move the board. For this reason if it is to be moved at all the dry materials should be placed at one side. If water is being used from a barrel it is all right to place the barrel at the end if necessary, as it is easily moved out of the way again. The same applies to bags of cement.

Supplies and equipment should be placed in an orderly manner and kept so at all times. Mixing boards, wheelbarrows, forms and tools should be kept clean. Allow nothing to be left over night with cement sticking to it.

Don't let the job get all cluttered up. Keep the traffic moving in one direction on each runway or passage. It is not hustle and bustle that count, but steady continuous output.

Be sure all forms are properly built and braced and that all lines are true and measurements correct before placing concrete in the forms.

MEASURING MATERIALS

In mixing concrete always measure the materials. It does not pay to guess. Test the sand and stone or gravel on every job of any size. Sometimes by rescreening the sand, not so much cement will be required to make a dense mixture. More cement does not always mean better concrete but greater density always does.

Fig. 5 shows a handy way of hand-placing concrete for a retaining wall along a side hill. Dry materials are first deposited at frequent intervals at *a*. From there they are shoveled to the board at *b* and dry mixed. The wet mixing is done on the board *c* and the concrete is shoveled from there directly into the forms. Two gangs of men can be used to advantage for mixing. As the work progresses the platforms are moved along and wheeling the concrete in barrows is done away with.

To supply water for a long section of concrete work it is handy to run a pipe line the full length of the job and fit this with hose connections at convenient points.

For foundation footings it may be better to do the dry mixing on the bank and the wet mixing on a board placed on the cellar bottom.

Start building concrete forms far enough in advance so that the carpenters will not have to slight their work in order to keep ahead of the gang mixing the concrete. Many mistakes are caused by too much haste in building forms and there has been more than one case where the foundation was found to be out of line when it came time to lay the sills of a house. When the forms are finished get out the plans, tape and level and make sure that everything is right. When a mistake is found, correct it immediately. Correcting mistakes in a makeshift way will only cause more trouble. Start right and stay right is the quickest in the end.

Forms should be strong and amply ridged, but they should be constructed so that they can be easily taken apart again, each piece coming away freely from the concrete. Carpenters who thoroughly understand form building will save time and money. Only loss can result from poor form building.

When the forms are taken down, remove all nails and pile the lumber neatly. This saves material and keeps it out of your way until it is needed again. Where the ground is not level, it is almost always best to store needed materials on the higher side of the work. This permits the materials to be moved down hill instead of up, as it is being used.

LACK OF PLANNING COSTS MONEY

Only during the summer of 1920 the writer received a letter from a man asking him to put in the foundations and build the first story (of stone) on his new house. He stated that he had all the needed materials on hand. His house was to be built on a fairly steep side hill and because the street was on the lower end of his lot all the lumber, stone, sand and other materials were placed at that point. It could have been delivered just as easily at the upper side of the house by carting only a short distance over a vacant lot just back of the one on which he was building and which he himself owned. The owner had to pay heavily for it afterwards.

This owner made another mistake. Fearing the price of cement was going up, he bought and had delivered the full amount required for the job. The cement was amply protected from rain, but it was piled on the bare ground so that he lost enough cement in that way to more than pay for any rise in cement prices that might have occurred. Cement should be stored well off the ground, keeping it well covered. Save the empty bags.

(*To be continued*)

Part II of Mr. Keir's article will take up stonework, brickwork and carpentry, discussing these matters in much the same way that excavation and concrete are handled in Part I. Practical ideas such as these may not be new, but they are always helpful and interesting.—EDITOR.

Start the Building Ball Rolling

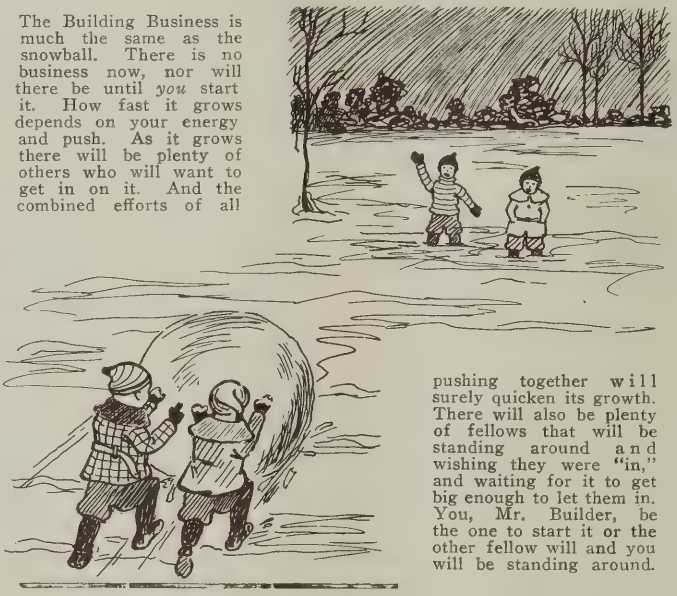
A Confidential Talk to Each and Every Builder on Getting Business

A MAN came into our office the other day. He was an old friend of ours and he told us the news that he had just lost his job. We made the remark that he might have a hard time to find another one just now. He looked us squarely in the eye and said, "There is always work for the man who is willing to work."

That remark sunk in. And we knew that not only is there work for individuals who are willing, but the same formula holds for a firm or company.

There is work to be done. Go out and get it. Now let us see *how*.

In the first place you are up against a popular ignorance of building conditions. The people want to build, but they think the cost is too high and that prices are coming down. The truth of the matter is that prices have come down a little, but this has largely been due to the urgent need for immediate money by certain manufacturing concerns. They could not borrow from the banks on any favorable terms and their only alternative was to sell their stock on hand in many cases at a loss. Many materials are today selling for less than it costs to make them simply because somebody needed money quickly and couldn't get it any other way.



The Building Business is much the same as the snowball. There is no business now, nor will there be until *you* start it. How fast it grows depends on your energy and push. As it grows there will be plenty of others who will want to get in on it. And the combined efforts of all pushing together will surely quicken its growth. There will also be plenty of fellows that will be standing around and wishing they were "in," and waiting for it to get big enough to let them in. You, Mr. Builder, be the one to start it or the other fellow will and you will be standing around.

It will probably be five or ten years before prices reach a pre-war level and it is up to the builders as their first step in going out and getting business to tell the building public about this. Read your magazines; read the views of big men of business on the subject. If necessary cut them out and send them to your clients; print a little folder about them. Tell your clients about the situation at lunch. Get them talking about it.

Tell them that whether prices are high or low home building must go ahead. Homes are always in order because they are not built for investment and after all it is always cheaper and better business to build than pay high rents. Build two-family houses and let the other man pay your rent.

The next stumbling block will probably be how to raise the money. Perhaps that is one of your own troubles. If you are going to get business, you will put one over on your competitor if you can be of any assistance to your client in telling him how to raise his money. Perhaps the bankers require him to put up too much starting capital.

It is one of your duties to post yourself on what ways are being developed for the benefit of the man with small capital. Get in touch with the Own Your Home Movement. Do you know that the Corn Exchange Bank of Chicago has openly declared itself as heartily in favor of this movement, because they realize that a man who owns his home is a better risk and a better depositor and a better citizen than the other fellow? They say so in that many words. Get in touch with this movement. They are holding a convention in Chicago this month and will hold another convention in New York April 16-30. If necessary, print another little booklet for your clients telling them "How to Raise the Money."

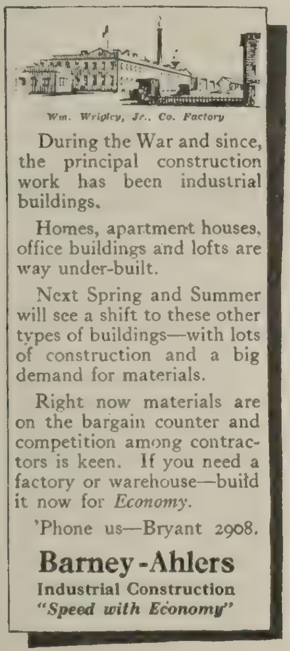
Attend your builders' conventions. Of course it costs money; but go and talk, listen and learn. Keep in touch with your industry—the architects, engineers, fellow builders, material men, real estate men and money men. Architects and engineers can tell you who are planning to build; real estate men can tell you who have bought property; financial men can tell you who has money enough to build.

Follow the work and doings of the National Congress of the Building and Construction Industry. They are going to determine definitely and accurately just where the industry stands in the matter of wages and prices of materials.

After you have convinced your public they ought to build and have found out who want to build, you have reached the same stage as the fisherman who has hooked his trout and is beginning the fight to get it into his basket.

The previous work has been important, but all that you have done is to sell the idea that now is the time to build and that your particular client can build, ought to build and would be better off if he did build. Now you have to convince him that you are the man to do the job. To do that you have to get down to brass tacks and win his confidence in you, your organization, your methods and your service.

Show him what you have done. Take him around; show him photographs. Let him talk with former clients and learn how faithfully and successfully you performed your end of the contract. Tell him what it means to him to have your service. Show him that all the cellars you have built have been dry; the roofs don't leak; the windows and doors are tight; that every room in the house is warm in the winter. Show him that all little details have been taken care of—that the house is beautiful, and convenient and that the owner is satisfied. Show him that you can mold his own ideas not merely into a house, but a *home* that his wife and kiddies will enjoy.



Wm. Wrigley, Jr., Co. Factory

During the War and since, the principal construction work has been industrial buildings.

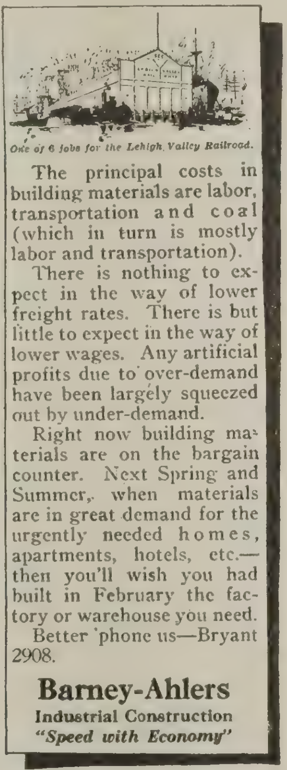
Homes, apartment houses, office buildings and lofts are way under-built.

Next Spring and Summer will see a shift to these other types of buildings—with lots of construction and a big demand for materials.

Right now materials are on the bargain counter and competition among contractors is keen. If you need a factory or warehouse—build it now for *Economy*.

'Phone us—Bryant 2908.

Barney-Ahlers
Industrial Construction
"Speed with Economy"



One of 6 jobs for the Lehigh Valley Railroad.

The principal costs in building materials are labor, transportation and coal (which in turn is mostly labor and transportation).

There is nothing to expect in the way of lower freight rates. There is but little to expect in the way of lower wages. Any artificial profits due to over-demand have been largely squeezed out by under-demand.

Right now building materials are on the bargain counter. Next Spring and Summer, when materials are in great demand for the urgently needed homes, apartments, hotels, etc.—then you'll wish you had built in February the factory or warehouse you need.

Better 'phone us—Bryant 2908.

Barney-Ahlers
Industrial Construction
"Speed with Economy"

How One Contractor Is Educating the Public

Show him the facilities at hand in your organization—how you can do your work more cheaply because you have better equipment, better men, better methods. Impress him with your scrupulous honesty in use, application and selection of materials—your concrete and stucco stay put because you have not thinned down the mixture with a lot of cinders.

Show him that your services mean more to him than a mere name—that your word is good—that the performance of your work is above reproach and that your bank credit is A-1.

You have got to work a lot harder than you used to if you are going to land the work. It is there, but you have got to go after it. Today's problem in the building industry is just as much a personal problem as the kind of sandwiches you will have for lunch. How fast and how successfully the industry recovers and gets back on its feet depends on what *you* do and you can't afford to wait for the other fellow to start the ball rolling, expecting to get some of the benefit of his efforts. The building ball will not roll and keep rolling until everybody (and that means *you*) gets behind with a good healthy push. Let's Go.

The New York State Association of Builders' Convention

ON February 1 and 2 the builders of New York State met in their annual convention at the Powers Hotel, Rochester. Many matters were discussed, but what seemed uppermost in their minds was, first, are wages coming down and when; and, second, in what way can the financial situation be improved for building.

There was a strong sentiment that wages were coming down. This was particularly true in Buffalo and Utica where reductions of nearly 25 per cent. had been effected. Rochester and New York were more or less standing pat on the present wage scales because of agreements already existing. The consensus of opinion was that the wage trend may not have started downward in some sections but that it certainly would in the near future.

The scarcity of skilled mechanics in the building industry was largely blamed for present-day inefficiency of labor and this was said to be due to the lack of apprentices in each trade. Good trade schools, it was stated, would supply this lack.

Many builders were of the opinion that bank appraisals of building values should be done by bankers with building experience. It was stated that honest valuation of property should consider location and income from that property rather than what it might cost to reproduce ten years from today.

In spite of the fact that the labor market seems to be plentifully supplied with bricklayers, wage disputes in all trades seem to hinge on what success the bricklayers have in their wage adjustments.

What Is the Situation in the Building Industry?

Men Who Are Close to the Facts Tell What They Know at the Housing Conference of the U. S. Chamber of Commerce.

Shall the Government Interfere?

William M. Calder, U. S. Senator

IF the United States is to avoid a housing subsidy it must afford every practical and economically sound facility for the active resumption of construction work. We may be approaching a condition of affairs such as exists in many European countries today. This will mean the adoption of European precedents born of paternalism of monarchies, rather than a continuation of American precedents which have made it possible for each man through exceptional thrift and industry to become a property owner.

New System of Taxation

I propose, as a member of the Committee on Finance of the Senate, to urge the decentralization of our Federal taxation system, so that a citizen may go to the authorities in his own locality and settle his tax matters finally and promptly each year. Matters to be thus handled are of no more vital concern than those of the draft boards which worked so successfully and which were decentralized.

As to the combinations in the building industry which exploited the public, I have given much thought to an act permitting, but not requiring, Federal incorporation to cover trade associations and labor unions, so that the aristocracy, at least, among these associations and labor unions might voluntarily incorporate themselves under the Federal law and come under Federal regulations. If such association benefit thereby, others will follow, and the responsibility of groups of employers and employees organized for trade purposes will be fixed, while collective bargaining will become a practical reality through making the bargain a true and binding agreement.

We should build up the basic industries of the country to supply the future needs of the people. The question which I have been turning over in my mind for months is why have we not used a larger part of our surplus labor and materials for the upbuilding of our own national plant, built more homes so that rents may be lowered; improve our railroads so that our goods can be promptly moved to market, improve our terminals, our coastwise shipping and our inland waterways.

PATERNALISM DOES NOT WORK

From the experience of England and France in attempting to solve their housing problems, we know that it is impossible to solve ours through Federal or State paternalism, because in doing this the government would be attempting to subsidize itself, and it is to be hoped that our reconstruction process will proceed through private initiative and enterprise.

No!

U. S. CHAMBER OF COMMERCE

WHEREAS, The Chamber of Commerce of the United States is firmly committed to the principles as laid down in its resolutions adopted at both the Seventh and Eighth Annual Meetings of the Chamber, among which were the following:

"The very essence of civilization is that there be placed upon the individual only that degree of restraint which shall prevent his encroachment upon the rights of others, thus releasing to the utmost individual initiative in every proper direction. . . . It is, therefore, essential that our government should scrupulously refrain from entering any of the fields of transportation, communication, industry and commerce, or any phase of business when it can be successfully undertaken and conducted by private enterprise. Any tendency of government to enter such fields should be carefully weighed in the light of its possible effect upon the very genius of our institutions."

AND, WHEREAS, there are now pending in Congress what are known as the Federal Coal Bill and the Packers Bill, both of which go far beyond any recognized principles of Government regulation to a point of actual control of operation of industry.

NOW THEREFORE BE IT RESOLVED, that the National Council expresses its approval of the decision of the Board, that provisions of these bills infringe upon fundamental American principles and also are specifically at variance with the resolution adopted at the last annual meeting of the National Chamber and therefore advises the Board of Directors that in the opinion of the National Council it is the duty of the Board to press the amendment of these bills, to conform with fundamental principles and if maintained in their present form to oppose them.

The Danger of Legislation

CLYDE DAWSON

Director Denver Chamber of Commerce

I AM making no excuse for the profiteer. I am not suggesting that there has not been profiteering. But I say that the danger from profiteering is a mere trifle as compared with the danger of such legislation as the Packers' Bill and Federal Coal Act, which goes to the breaking down of the very foundation of our system of government. There are laws, and if they are not adequate they can be supplemented in a manner to punish all unfair practices, including profiteering or anything of a like character, and these laws should be applicable to everybody alike so that every man, in every industry and in every business, stands upon the same footing with the statute law crystallized so that he may know what he can and what he cannot do.

But to say that some commission, made up of men unfamiliar with the industry, in conjunction with the President, driven with all the cares of state, should in times of peace be permitted to exercise the powers granted by the section referred to is not legitimate regulation of business; it is control of business; aye, it is even more than control, it is the conduct of business and, carried to the extreme permitted by this section, might and undoubtedly would operate in absolute confiscation of private property. Our Government was meant to be a government of laws and not of men.

Labor's Part

JOHN A. VOLL.

Representing Samuel Gompers, President A. F. of L.

LABOR will go the full limit in honest cooperation in the building of homes, if for no other reason than that of necessity, for it is labor that suffers most when housing facilities are inadequate to meet the living standard of the times.

Permit me, however, to briefly outline as I see them, some of the fundamental reasons for housing shortage. First was concentration of all effort and material for purposes of winning the war. Second, breakdown in the country's transportation facilities. Third, inflation of money owing to its demand for war purposes. Fourth, high fictitious prices through profiteering in practically all materials that enter into house building. Fifth, failure of the Federal, State and Municipal governments to cooperate and properly function on a domestic condition so vital to government and society as a whole. As to the first three they were visible and apparent to all. The first is no longer a factor, the second is functioning much better and is being gradually corrected. Third, falling of prices and the soaring of stocks in the air with no place to light is evidence that the balloon has bursted and that sound legitimate credits such as property will again come into their own, especially will this be true when the profiteer and speculator in the necessities of life are put in their proper places. The fourth, while it was generally felt that that condition prevailed, it was never fully determined until a searchlight of thorough and impartial investigation was turned upon building of all kinds in New York that has so far resulted in a number of individuals and firms pleading guilty with indictment hanging over the heads of numerous others. While heartily agreeing with this action of State and Federal Governments I do not want to be understood as being one of those who believe that government intervention or control of the legitimate activities of its citizens should be continued or agreed to or that such action would be a panacea for our ills or problems.

Labor, I might say, as represented by the American Federation of Labor, stands for the private ownership of property, hence another strong reason for its interest in the building of more houses; it distinguishes, however, in accordance with its light and judgment what it believes to be purely functions of government and that which belongs to private enterprise and activity and since there is a wide difference of opinion among all classes on this subject labor has ample grounds for agitating its principles on this question into the laws of the land. This brings us to the question of whether government should cooperate in the housing situation.

GOVERNMENTAL COOPERATION

Austria, one of the former great powers, has collapsed and there is no secret of what is going on in Russia and other parts of the world which makes it obvious that unless there is a cessation of military preparedness throughout the world sooner or later there will come an upheaval the result of which no one can prophecy, hence it might be well to give thought to government financial cooperation for the purpose of stimulating house building from which it will receive immeasurable return even though there is some financial loss, for after all is said about preparedness for war a government's greatest asset is to keep its own household united and in order for with this condition prevailing a nation will rise as a unit in its might and strength to repel attack or to save civilization if it becomes necessary, as our country did when it was seriously threatened. When we take into consideration that approximately 4,500 comfortable houses can be erected for what it costs to build one modern battleship, we are brought to a realization of the astounding amount we are contributing for protection because the world is armed.

With these conditions, of which organized labor is fully aware; cognizant also of what is going on throughout the world and loyal to our government and its institutions, it is apprehensive and constantly calls attention to the necessity of all organized groups within government working together in greater harmony and *honest* cooperation.

The Public Welfare

R. GOODWYN RHETT

Charleston, S. C.

IN taking up the various phases of the problem of making up the shortage of a million and a half houses, we cannot afford to overlook or disregard the bearing which such constructions will necessarily have upon the permanent welfare of this country. We cannot afford to countenance or permit any backward step in the standards of living which have been established either by law or by public opinion—for the standard of living of the great mass of the people is the surest index of progress in the march of civilization. We cannot afford to forget that in our house building we are laying the foundation for our home building and that upon the home and its development is largely going to depend the future of American Democracy.

Building and Housing Conditions

ERNEST T. TRIGG

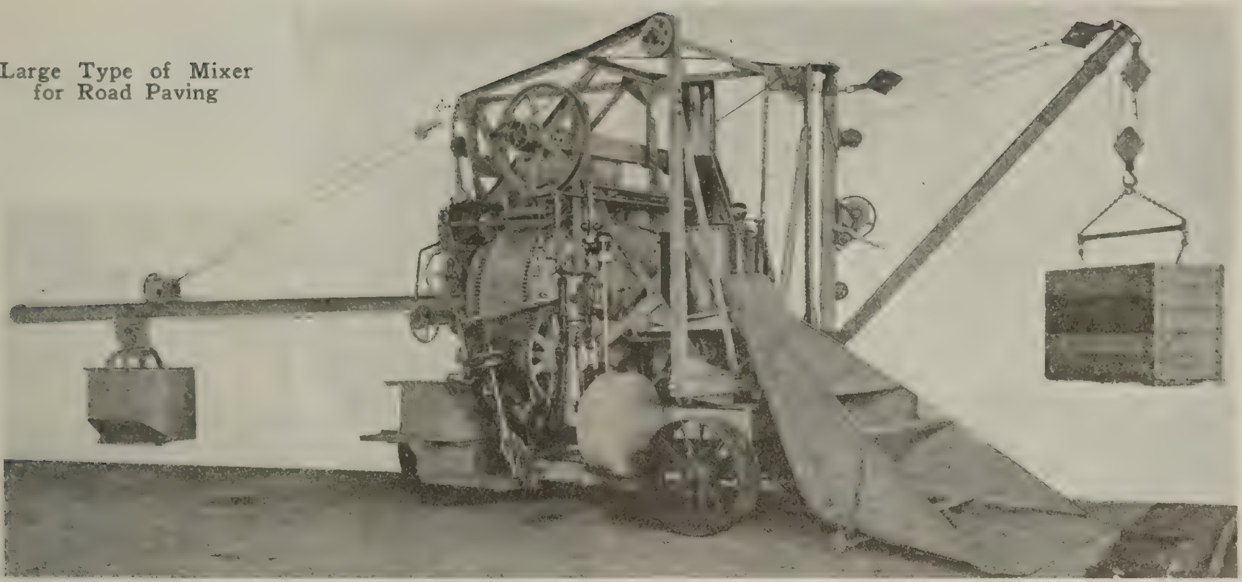
President National Federation of Construction Industries

IT seems apparent that a reduction in transportation rates cannot be looked for in the near future, although the problems with which the construction industries struggled in connection with the shortage of transportation facilities have, of course, been removed. Coal is dropping to a more reasonable basis. In December, 1920, bituminous coal in the Pittsburgh region sold, per gross ton, f.o.b. mine, for $4.50 per ton. It does not seem probable that this figure will rapidly drop further and it is apparently quite generally agreed that it will never approximate the pre-war price. Building union-wage agreements have been largely retained at their peak level, though some workers are accepting reduced rates, more or less in conformity with the drop in the cost of living.

Rents have continued on a steadily upward trend to the first of the year, passing 58 per cent. over 1914 values in July, 1920, and the present housing situation certainly indicates that they will continue to be higher than were the prewar values.

The general deflation already started, as indicated by the above figures, gives reason for the belief that if all interests concerned with the housing situation will promptly cooperate in a fair and proper way for the purpose of bringing costs down to a reason-

(*Continued on page* 55)



Large Type of Mixer for Road Paving

The Concrete Is Carried on the Long Boom to the Point Where It Is Wanted

Mixing Concrete Thoroughly, Quickly and Correctly

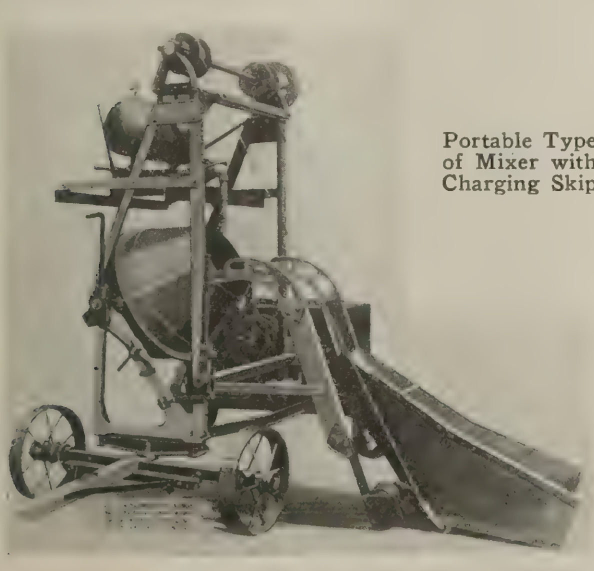
A Big Difference Between Holding and Mixing Capacities — Mixing Capacity Depends on Improvements

THERE is a difference between really mixing concrete and simply throwing together a lot of stone, sand, cement and water, stirring it up and calling it a job.

Concrete mixers today are designed with three main ideas in mind. First, to mix concrete quickly; second, to mix concrete thoroughly; and third, to mix concrete correctly, not too dry and not too wet.

Speed on the job is necessary. This means that the moving parts should be few in number, strongly built and well lubricated. There should be suitable guards to prevent the wet concrete from slopping over. The blades should be correctly proportioned and strongly built to stand the wear.

Mixers are now built with charging devices to increase the speed when



Portable Type of Mixer with Charging Skip

Note Water Control Tank

Charging the Mixer

Hot Mixer Used in Road Work

Mixer Designed for Close Quarters

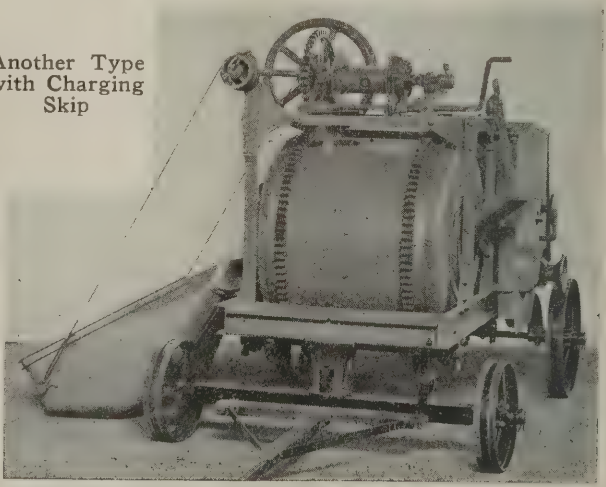
charging the material. Some of these devices are in the nature of a skip; some consist of a charging platform with a small ramp. Whatever it is, it must be quick and easy to operate. Often a measuring hopper enables the charging to be done at the same time that the mixing and discharging are taking place. In fact the charging of the machine is then continuous and there are no periods when the laborer must sit on the handle of the barrow and wait for his turn.

Quick discharge is also necessary. Sometimes this is accomplished by tilting the mixing bowl. In other cases, the discharge blades inside the mixer do the work. The discharge must be complete because if any material is left in the mixer it reduces the capacity of the mixer by that much. It is also necessary that no air be churned up in the concrete because this only weakens the mixture and there must be complete control of the discharged mixture so that individual barrows may be filled without spilling or the concrete may be emptied entirely into the chute.

Good mixers do not stir; they *mix*. The opening in the drum should be large enough to see how thoroughly the mixing is done, but it should also be guarded so that there will be no spilling.

Many types of machines are equipped with a water control to insure proper wetness of the mixture. This makes it always a sure thing that the last batch of concrete will be the same as the first. Too much water makes a cement that requires longer to set; while too little makes a cement that is harder to handle in chutes and on the trowel. These controls generally consist of a tank which can be filled

Mixer Designed for Handling Mortar and Plaster



Another Type with Charging Skip

Drum Type of Mixer

Mixer With Hoisting Drum at the Right

to any desired height, or which can be made to discharge any desired amount of water.

The capacity of a mixer really means more than just how much the mixer holds. It should mean how many cubic feet can that mixer turn out in an hour. That is the real test and a contractor wants to know that more than he wants to know how much dead weight it will hold. Unfortunately most companies do not rate their mixers in this way but it is suggested that such a rating would show how good their machine was and how complete and improved it was.

For example, a skip charging device will increase the real capacity of a machine from 50 to 75 per cent. Quick and thorough mixing blades will improve it some more. Rapid and complete discharge will show another increase. Correct water control and no slopping or spilling, still another. And a measuring hopper will enable the charging to go on all the time without any waiting periods. For these reasons one 5-cu. ft. machine may turn out enough mortar to keep 15 masons busy while another machine of the same size with more improvements would probably keep 25 men at work.

Some mixers are made not only to handle mortar and concrete, but mixtures of tar and stone as well. One of these mixers is shown with this article.

A mixer that is designed for mixing mortar and plaster only is shown with this article. This type of mixer is fast and economical because it is built especially for that purpose.

Another type of mixer which also contains a hoisting drum and skip for rapidly moving concrete to a distant discharge chute is likewise shown. This combines a mixer with a placing plant and was designed for the purpose of eliminating much of the labor of placing concrete in foundations, floors, etc. If careful attention is paid to properly locating the mixer in the first place the saving in time and labor is considerable.

The skip and track is built of light material and lends itself more flexibly to changes than does a tower. There are places, however, where the work is more or less cramped. In such cases this device cannot be used and a tower is more practical.

In the April issue will be given some useful charts for estimating the cost of concrete and concrete forms for varying costs of labor and materials and for different mixtures. The Concrete Materials Cost Charts are based upon the assumption that one barrel contains 3.8 cu. ft. of cement and that the voids in the stone or gravel used are 45 per cent. In working out the Form Work Cost Charts, it has been assumed that the lumber will be used three times before it is scrapped. These curves have been drawn up by Mr. George C. Habicht, South Hadley, Mass., and we believe they will prove valuable short cuts in estimating on concrete.

Same Mixer Used in Connection with Placing Plant

Conventions and Meetings

On February 14, 15 and 16 the American Concrete Institute held its convention in Chicago. At the moment of going to press we do not have available any report of the convention, but from the tentative program issued we feel sure the papers and discussions will be worth while.

The National Fire Protective Association will hold its annual meeting in San Francisco on June 14, 15 and 16. It is planned to leave Chicago June 7 or 8 and a day will be spent at Grand Canyon.

Giving a Frame Roof a Thatched Appearance

Framing Details of Roofs with Rolled Edges

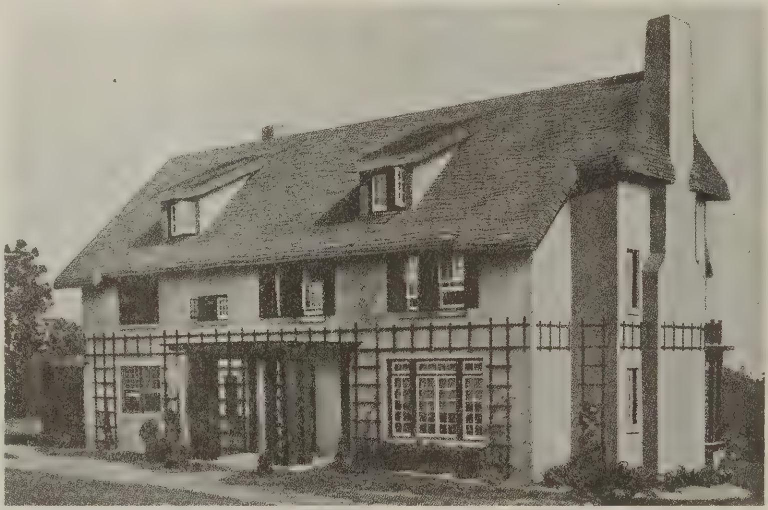
MANY interesting roofs are now produced by rolling the edges and laying the shingles in irregular wavy lines giving a unique thatched effect. While the framing of such a roof is more or less different from the usual framing it is after all simple as shown in Fig. 1.

The whole roof is given a slightly convex surface by furring on each rafter from four to six inches in height in the center of roof, and diminishing furring to nothing at ridges and eaves. At the gables, furring should be constructed with the greatest care and covered with one inch by two inch shingle strips running with the roof rafters, which carry the general convex line of roof to meet the running verge board. One inch by two inch shingle strips should also be used on valleys and hips running from eaves to ridges and on eaves running at right angle to rafters.

The construction of furring is of the greatest importance, for with this clumsily or cheaply done, no dexterity in laying the shingles will bring successful and artistic results. At the rounding of the gables, furring should be brought well forward to the verge board and then returned against it, forming in section the arc of a circle. This rounding of the gables is greatest at the ridge and is less at the eaves.

On the main roof, when a decided softening of the gables is wanted, it is often advisable to drop the roof rafters gradually at the ridge for a distance of three or four feet back from the verge board. To be effective, the drop at verge board must necessarily be sudden. This roll at gables should be constructed with the greatest care. It has been the fault of some Architects and Contractors who have used the thatched roof to make the roll at gables too short.

Caution should be used in building the rounded and flat surfaces, to lay the shingle lath or roof boarding with sufficient spacing to allow for ventilation, as a roof properly ventilated will dry off more quickly after rains, and greatly increase the life of the shingles.



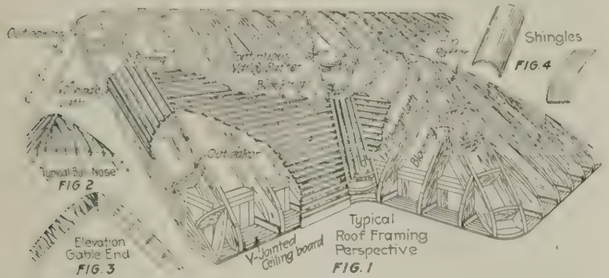
Home of E. D. Shearman, Jamestown, N. Y.
Freeburg & Fidler, Architects

On the rounding of the gables, on the valleys, eaves, hips and quick turns, and the angles between the side walls of a dormer, it is necessary to use shingles which are furnished bent, as shown in Fig. 4.

On the first course at eaves, square butt shingles bent to a 20″ radius are used in double thickness, the inside of the butts to be on a plane parallel with the wall of the building. This point is the beginning of a curve, the radius of which is to be not less than 20″ to the point of merging with the roof line.

Shingles cannot be bent against the grain or crosswise, to a radius of less than 20″. Machinery and other equipment is constructed to bend to this radius, and plans must be drawn accordingly. Shingles bent with the grain or lengthwise, to be used on valleys, gables and hips, can be bent to a 10″ radius. They are flexible and can be used on almost any radius, whereas those bent against the grain or crosswise, are not as flexible.

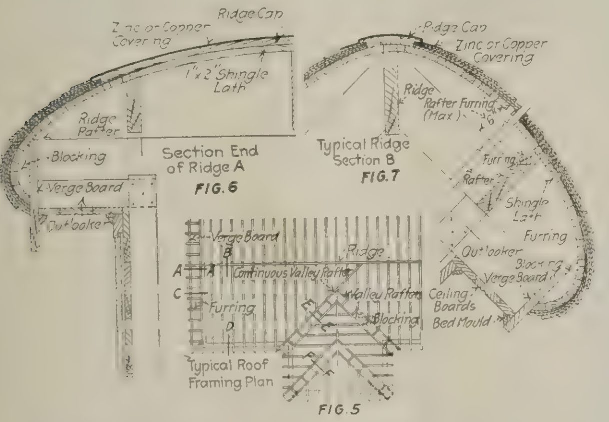
On the rounded surfaces of the eaves it is necessary to use sixpenny nails, nailed as closely to the exposed part of the butt as possible. In some cases of very quick turns it is often advisable to back-saw or split shingles into narrow strips. In some cases of quick turns it may be necessary to nail the shingles through the butts. On the balance of roof the regular size shingle nails should be used, preferably of zinc, zinc-coated or copper.



Shingle laths 1" x 2" are laid in usual manner except an Gable Ends, Hips and Valleys. On gable ends laths run parallel to rafters. On hips and valleys the laths run from eaves to ridge.

FURRING—All rafters are furred from 4" to 6" at the center diminishing to nothing at the eaves and ridge giving the roof a slightly convex surface.

Aside from the rounding of the gables and the softening of the eaves and ridges, the best feature of this roof is the texture produced by the long, irregular waves of shingles shown in Fig. 11, the courses varying in exposure to the weather from one to five inches.



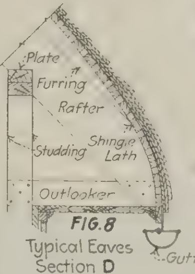
To obtain the best results for the roll of the gables, the furring should project well beyond the verge board at the Apex and this projection should be gradually reduced toward the Eaves.

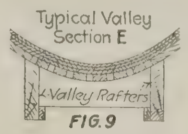
The drop from the Ridge to the Verge board should start three or four feet back from the face of the Verge board and curve down gradually as shown in the detail above and the perspective below.

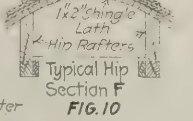
On the rounded surfaces shingles should be nailed as closely to the exposed part of the butt as possible with sixpenny nails. Where very quick turns are made shingles should be soaked in water and nailed through the butt.

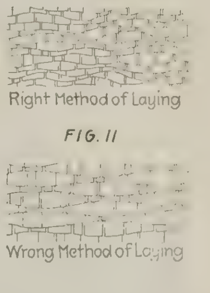
To produce these waves, shingles are sawed at the butts in a variety of special thatch patterns, and laid with the long side of each shingle to the short side of the previous one until the maximum exposure is reached. Then to bring the course down again to the minimum exposure, this procedure is reversed, i. e., the short side of each shingle is laid to the long side of the previous one. This manner of laying the shingles is carried out on each course of the entire roof surface with the exception of the first at eaves. There should be no uniformity in the courses, that is, the wave of each course should vary.

On the eaves the best effect is gained by laying the shingles from one to three inches to the weather until the flat portion of roof is reached.









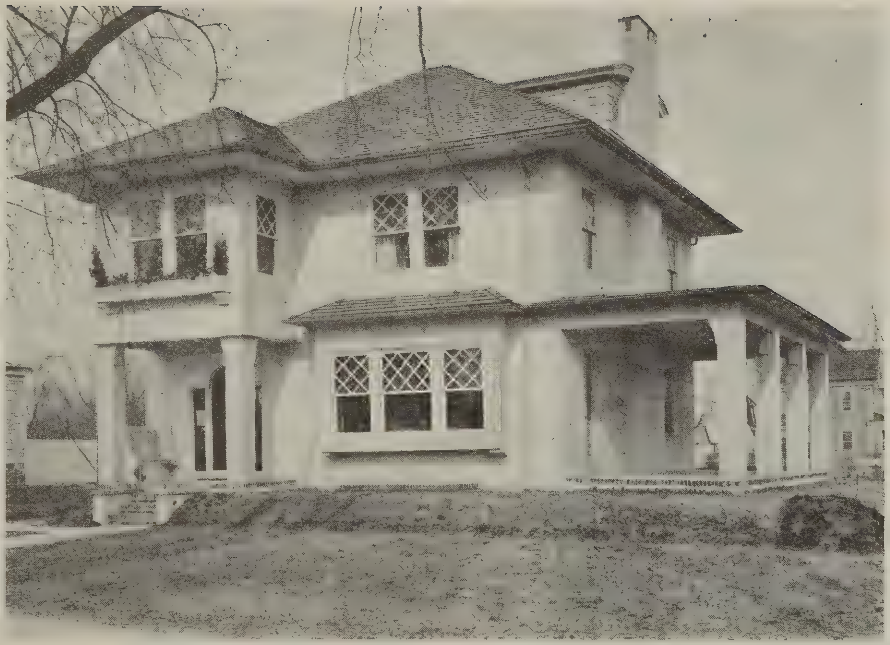
The radius of the roll on the rake should never be less than 10". The blocking projects well beyond the Verge at the Ridge and decreases toward the Eaves.

The thatched effect is better gained on the flat portion of roof and gable ends by an exposure of from one to five inches to the weather with an average exposure of three inches, rather than from two to five inches with an average exposure of three and one-half inches to the weather, as is sometimes done for economical reasons.

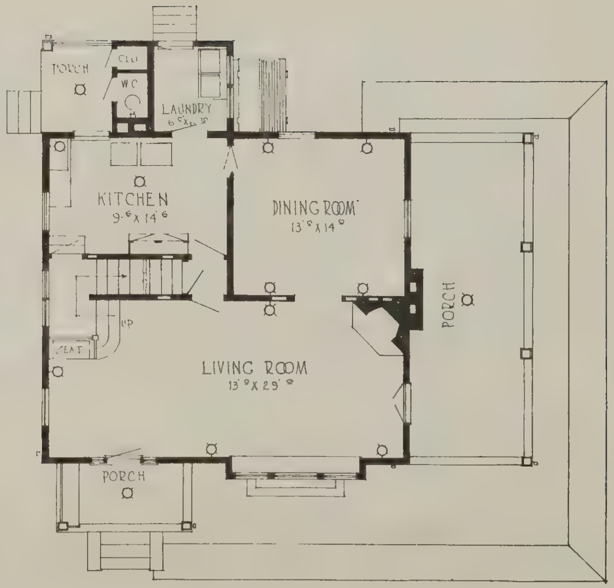
On the rounded ridges, the shingles can be used as shown in Section F or they can be capped with a suitable metal (Section B), preferably copper, rounded to appear from below as a continuance of the shingles. Metal would be somewhat cheaper but not quite so artistic.

The construction of the gutter is shown in Fig. 8. This arrangement does not hide the rounded eaves, and when painted to match the shingles it accentuates the droop at the eaves when seen at a distance.

Naturally it requires more shingles for a thatched roof than for a regular roof, but it is more durable as the average exposure is less.



Front View

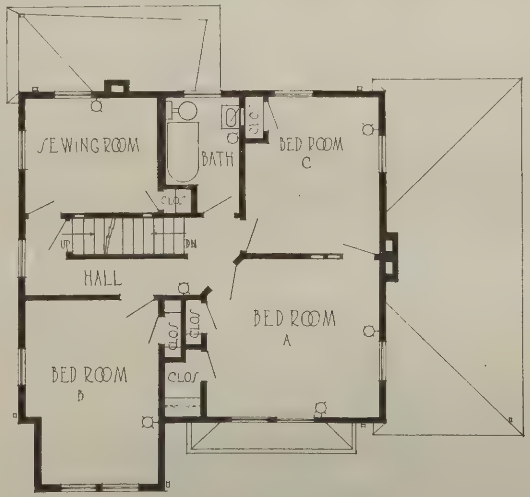


FIRST FLOOR PLAN

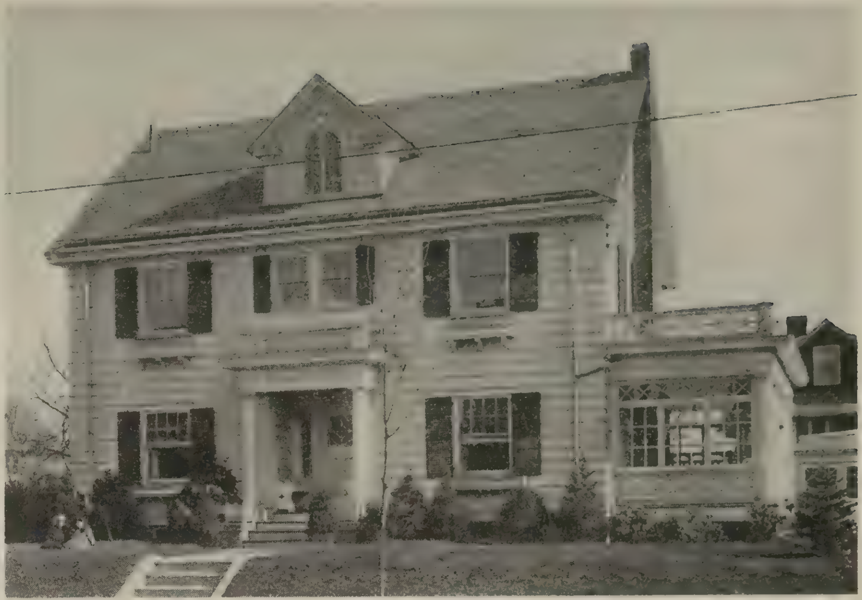
BIRDSALL HOUSE, WENONAH, N. J.

J. Fletcher Street, Architect

This stucco house of seven rooms combines all the features of convenience and comfort that are to be found in the square house when properly planned. The large living room, which extends entirely across the front of the house, has direct access to the wide porch. The arrangement of the hall in the corner of the living room is a space-saving and attractive feature. The convenience secured by the placing of the laundry and toilet accessories in an extension at the rear of the kitchen is one that every housewife will undoubtedly appreciate.



SECOND FLOOR PLAN

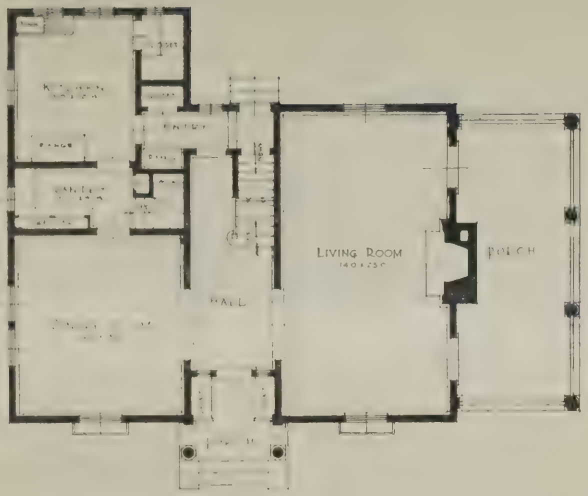


HOUSE OF THEODORE F. SLOAN, PATERSON, N. J.

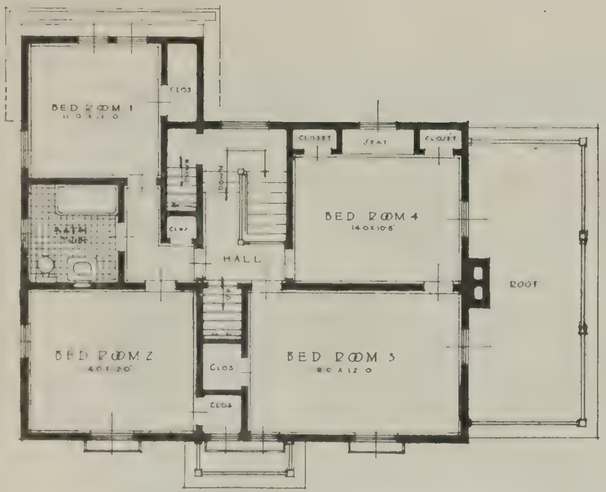
Charles H. Benjamin, Architect

Exterior walls are of 2"x4" studs, sheathed and finished with ¾"x10" rebated white pine siding. All exterior woodwork is white pine, painted white excepting shutters, which are a pale green. Roof is covered with variegated slate. Box gutters lined with tin, and leaders of galvanized iron, painted white. Chimney of brick. Living room fireplace of red tapestry brick with Colonial wood mantel. All woodwork throughout is of whitewood with white enamel finish.

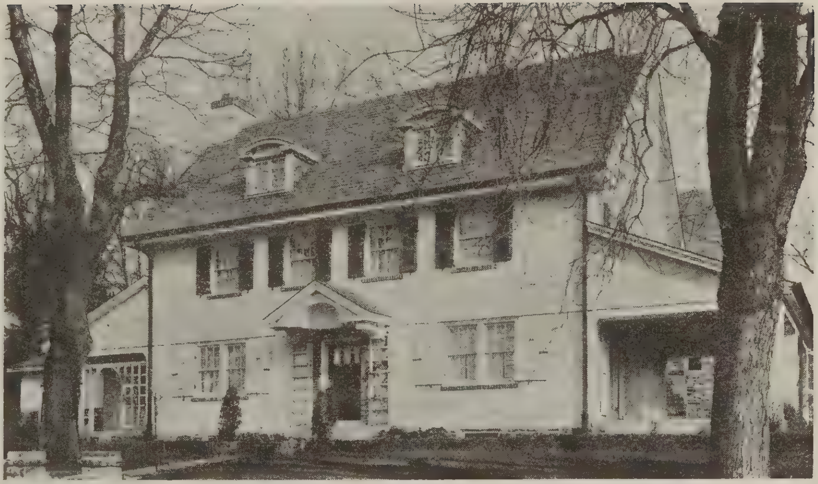
Floors are of white oak with border, wax finished. Stairway is of Colonial design with birch treads, newels and handrails, with mahogany finish. The remainder of stairway is whitewood with white enamel finish. Dining room walls are paneled 5'x6" high and finished with plate shelf. All walls are finished with flat paint. All doors are of birch, mahogany finished, with two panels. Bed room closet doors are glazed with mirror, full height. Bath room is tiled 4'x6" high.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

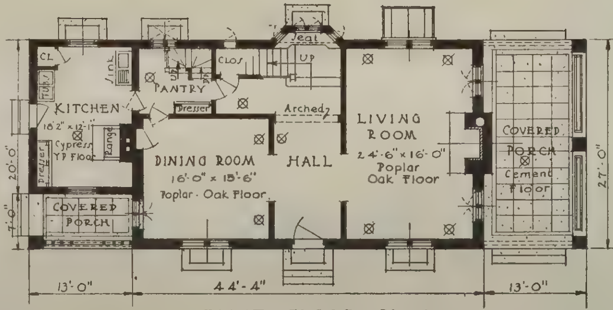


Front View

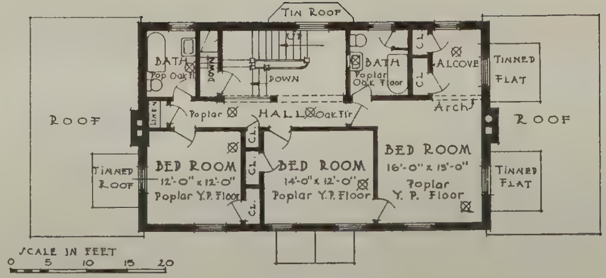
Entrance

RESIDENCE OF MRS. EDITH W. SULLIVAN, MERION, PA.

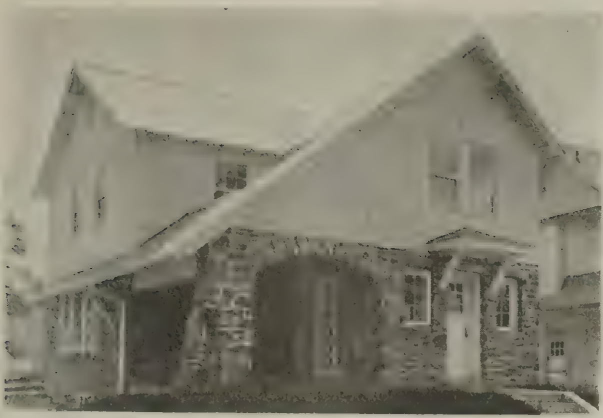
Savery, Scheetz & Savery, Architects



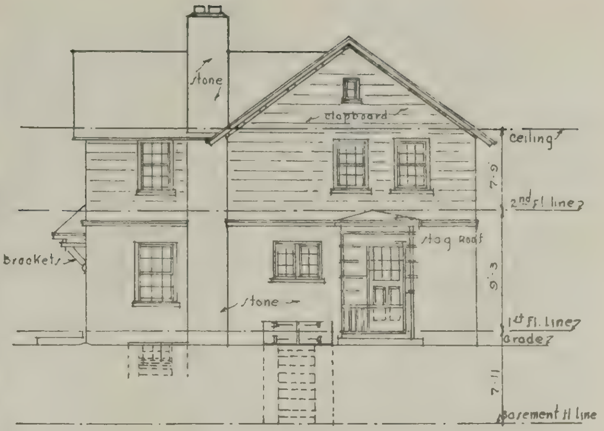
·FIRST FLOOR PLAN·



·SECOND· FLOOR· PLAN·



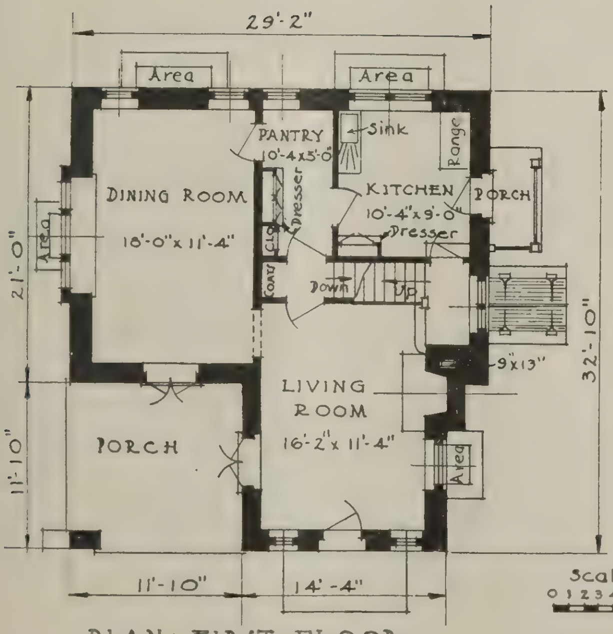
Front View



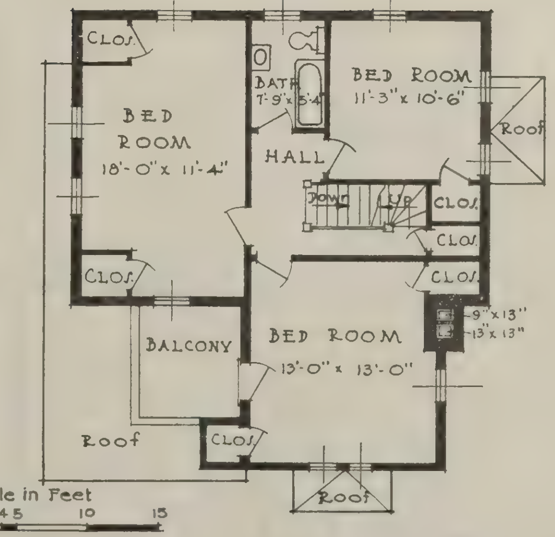
—SIDE ELEVATION—

HOUSE AT NARBROOK, PA.

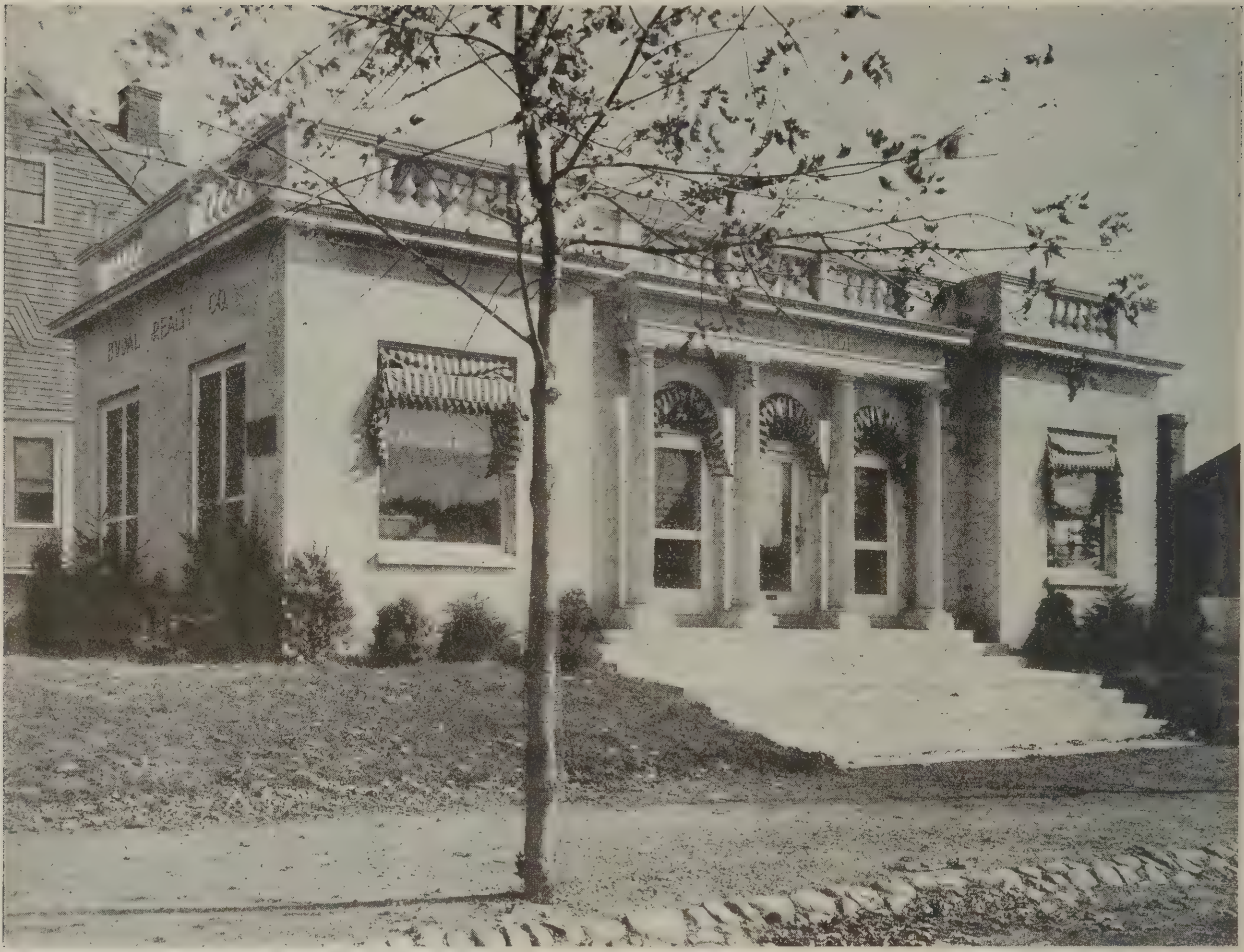
D. K. Boyd, Architect



·PLAN· FIRST·FLOOR·



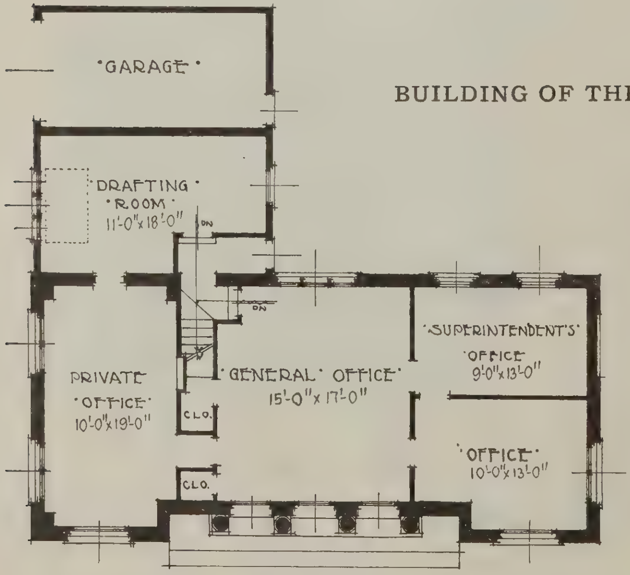
·PLAN · SECOND · FLOOR·



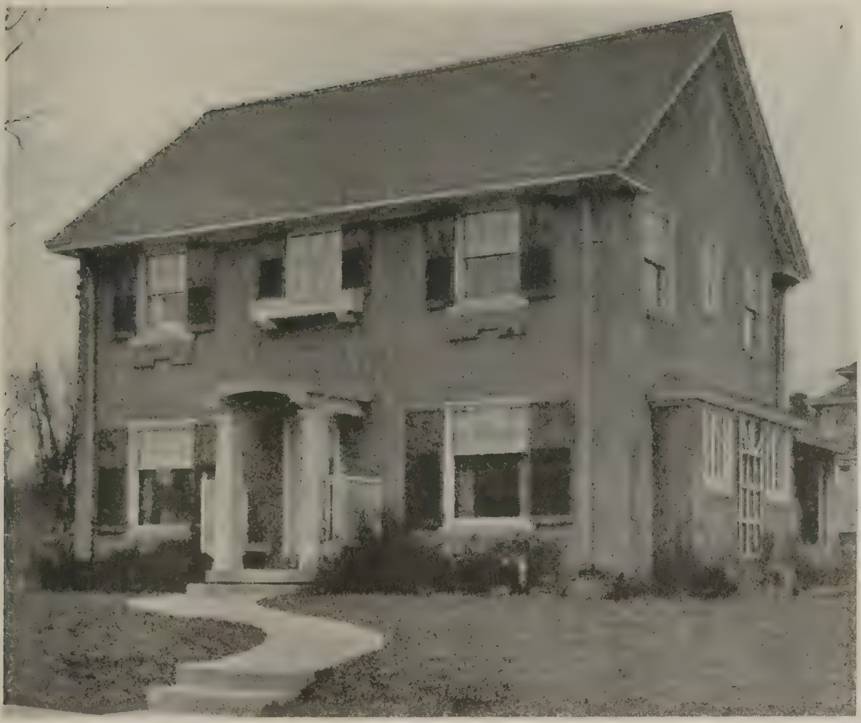
Front View

BUILDING OF THE BUDAL REALTY CO., MAPLEWOOD, N. J.

K. W. Dalzell, Architect


GARAGE
DRAFTING ROOM 11'-0"x18'-0"
DN
DN
SUPERINTENDENT'S OFFICE 9'-0"x13'-0"
PRIVATE OFFICE 10'-0"x19'-0"
GENERAL OFFICE 15'-0"x17'-0"
CLO.
CLO.
OFFICE 10'-0"x13'-0"

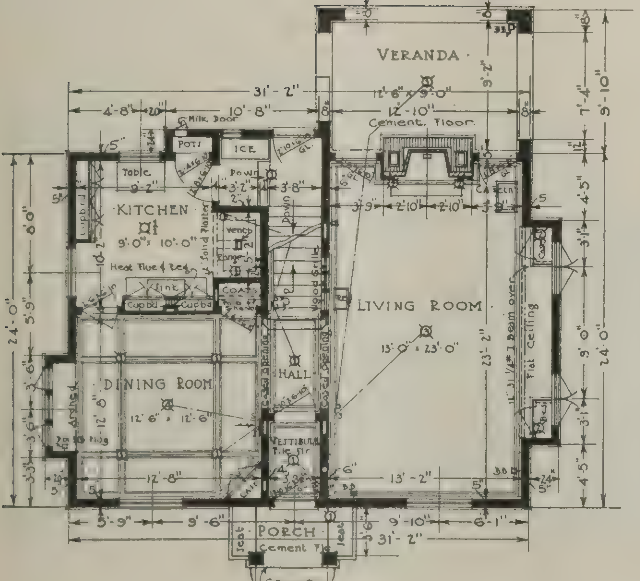
Floor Plan

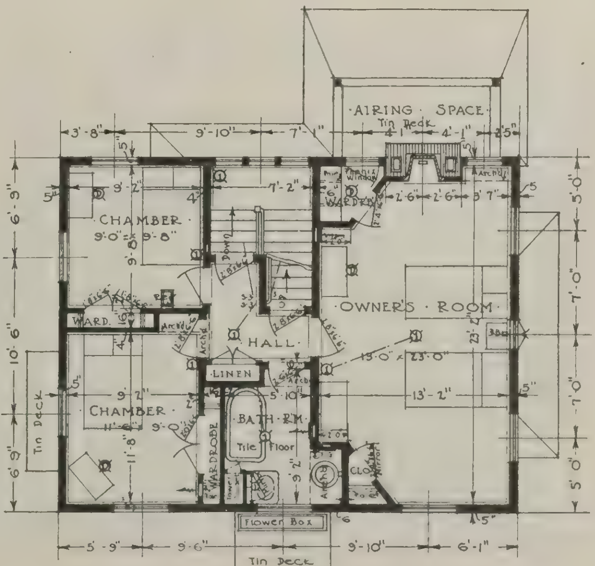


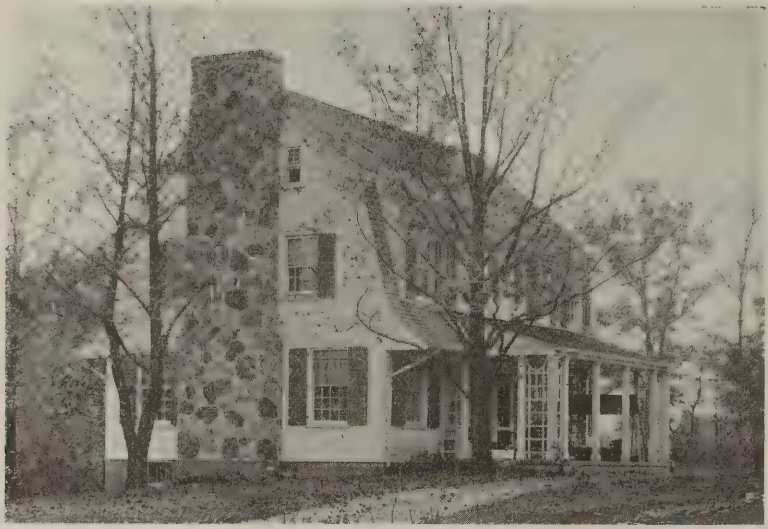
Front View

HOUSE OF ROSCOE GODFREY, MILWAUKEE, WIS.

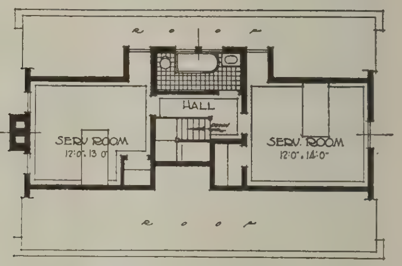
Clare Hosmer, Architect







Front-Side View



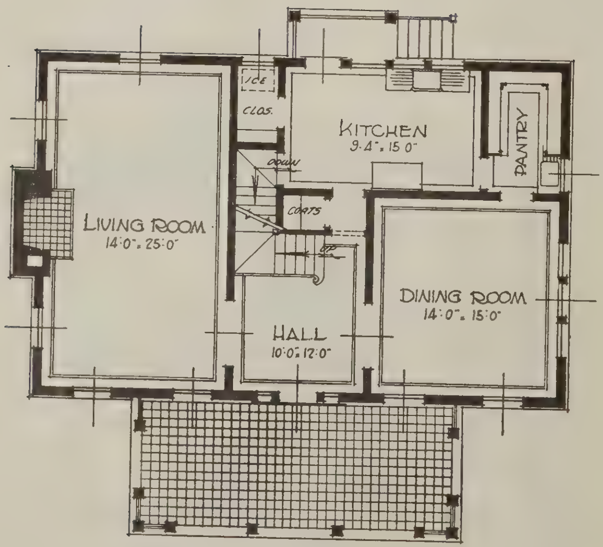
THIRD FLOOR PLAN

SCALE OF FEET

0 5 10 15

HOUSE OF A. J. BLEECKER, TENAFLY, N. J.

R. C. Hunter & Bro., Architects



FIRST FLOOR PLAN

SCALE OF FEET

0 5 10 15

Here a convenient and compact plan, combined with a well-proportioned exterior, gives a home of beauty and character. Much of the attractiveness of the exterior lies in the simplicity of the design, the grace of well-proportioned roof and the refinement and delicacy of the detail. The house is located on a gently rising ground with a gradual slope toward the rear. This allowed the house to set very close to the grade at the front, giving a low, spreading effect, which is further enhanced by the wide, projecting eaves of the roof.

The relation between the porch and the house is pleasing. The roof of the porch forms a graceful extension of the main roof and is supported on slender and finely detailed columns symmetrically disposed. The windows are large. Divided into numerous small panes with heavy muntins (the true Colonial spirit) they give real character to the exterior and make the interior light and cheerful. Blinds and shutters contribute to the charm.

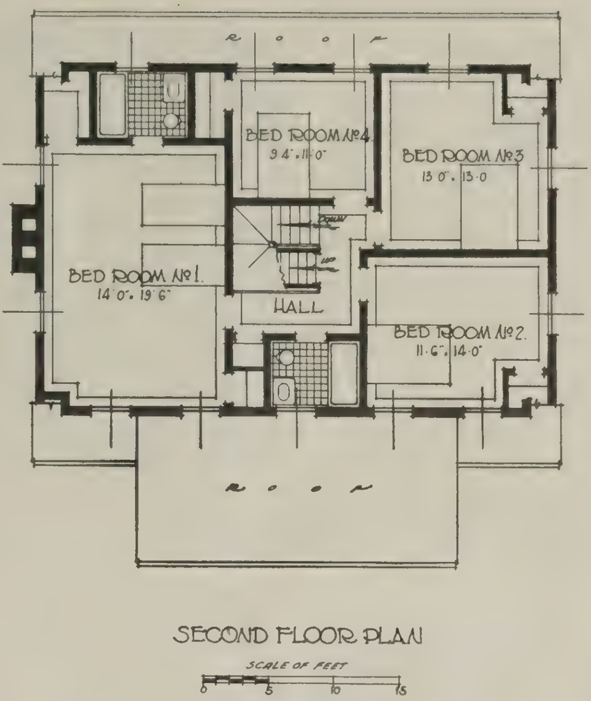
The sturdy chimney, one of the attractive features of the house, dominates the end in a pleasing manner and gives life and interest to the composition. It is built of native rubble stone in a great variety of colors, laid with wide white joints in an irregular manner, giving color and texture that is admirable, and standing out in strong contrast with the plain white color and fine texture of the shingle walls.

The first floor plan provides a large living room with a great open fireplace, an entrance hall with a finely detailed Colonial stairway that rises gracefully to the second floor, a good-sized, pleasant dining room and a convenient kitchen and serving pantry. The pantry has ample cupboards and a sink. The kitchen is completely equipped, and from it stairs lead to the cellar. A coat closet is provided off the main hall.

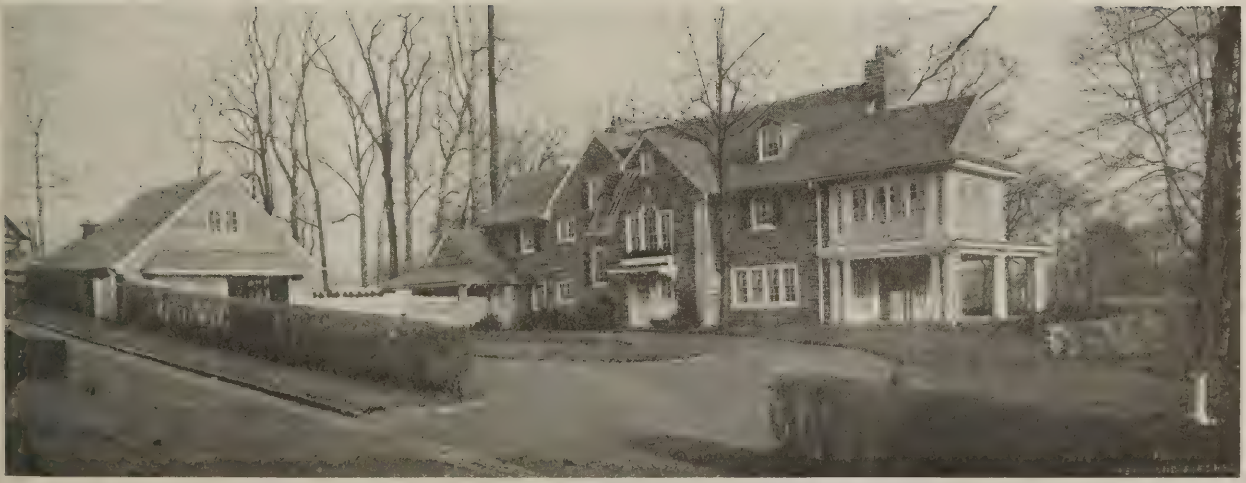
On the second floor are four good bed rooms and two bath rooms. Closet space is not lacking. The amount of available floor space is surprising for a house of this size, and it is here that the great economy of the plan is apparent.

Another unusual feature of the plans is the roomy third floor, which provides two servants' rooms and a bath. Yet to look at the exterior the house loses none of its attractiveness by the introduction of these very desirable rooms.

The interiors are carried out in a delicate Colonial treatment, in harmony with the exterior.



House of A. J. Bleecker, Tenafly, N. J.
(See page 46)



HOUSE OF J. A. EMMONS, MERION, PA.
Seeburger & Rabenold, Architects

Editorial

Less Talk and More Thinking

THERE has been so much written and spoken lately about the housing shortage and the stalemate in building construction that we are completely "fed up" on the subject. There *is* a housing shortage and building *is* at a low ebb. But what is the reason for all the pessimism?

Without laying any claim to a gift of prophecy, we may say definitely that building operations will begin again in spite of the cost of materials and of labor. The very acuteness of the housing shortage tells us that building *must* continue rapidly. All the laws of economics and common sense tell us that a demand will be supplied in proportion to its acuteness—and no one has yet denied that this demand is acute.

We read in the daily press of marriages, of births, of immigration and of fires. All of these factors indicate that building operations will resume, must resume, in fact, because events only increase the demand and serve to make it more acute.

The spirit of the day is to grumble. Muckraking and pessimism smear up the landscape and obscure the vision of the future. The papers print it because the people read it and the people read it because the papers print it. And there you are.

The curse of the age is that the mass of the people are content to let a few do their thinking for them. They have gradually been educated *not to think*. The need of education and independent but co-operative thinking tempered with a grain of optimism has never been more apparent than it is today.

Build Homes Today

NOBODY ever plugged a hole in a leaky boat by sitting and looking at it. There is a law on the high seas that if a ship is found to be deserted she belongs to the one who finds her and tows her to port.

The building industry today is in much the same position of a leaky boat and too many are waiting for the next man to do the plugging. Stop and think a moment, Mr. Builder. If your boat goes down you go with it. If some one else saves it, he keeps it and you lose it.

The United States Government hesitates to interfere with industry, believing that insofar as it is properly conducted it should be left to private interests. On the other hand, if those interests in the building industry show that they are incapable of handling the present situation there is no other course but for the Government to step in for the preservation of our American institution, the Home. If no other building goes ahead, we must have homes. We must have them for the sake of health, morality and the preservation of American ideals. If builders won't build them the Government will, but we must have them.

Franklin T. Miller, in his advice before the Housing Conference of the U. S. Chamber of Commerce, said, "Do not build today." The statement was unfortunate because it showed how little thought Mr. Miller had given to the problem. If Mr. Miller referred to business, industrial or municipal building, we might say "Amen." But he forgets that, in building his home, the American is not building for investment and that it is always a better business proposition to build than to rent a home, no matter what prices are.

False Houses

THERE are many ideas and new designs advanced for the relief of the present housing crisis. Most of them show that little thought has been given to the demands of that crisis.

We have in mind now such proposed solutions as one, two, and three-room apartments with sufficient apparatus and devices to give all the advantages of two, four or six rooms. From time to time BUILDING AGE has devoted space to such apartments not because they are a solution but because the idea is more or less new, and does help to some extent.

The real evil of the present-day crisis is that too many people live in too small a space for the preservation of health, morality and American ideals What benefit does one room have if but one person can live there? Granted this one room can be made into a kitchen, bed room, living room or swimming pool by the waving of a magic wand, but it does not permit of housing the same number of people as a 4-room house. Therein is the fallacy and until we get rid of some of our new-fangled notions and get back to building real American houses there will always be a housing crisis.

Part I of Mr. Van Gaasbeek's article appeared in the February number of Building Age *and discussed in a general way the method of laying out a frame roof, concluding with the selection of timber sizes for the job.*

Part II takes up in this issue the method of laying out the plate and rafters, discussing the subject in detail.

Part III will appear in the April issue, and will conclude this series of articles on the subject.
—Editor.

How to Lay Out a Frame Roof

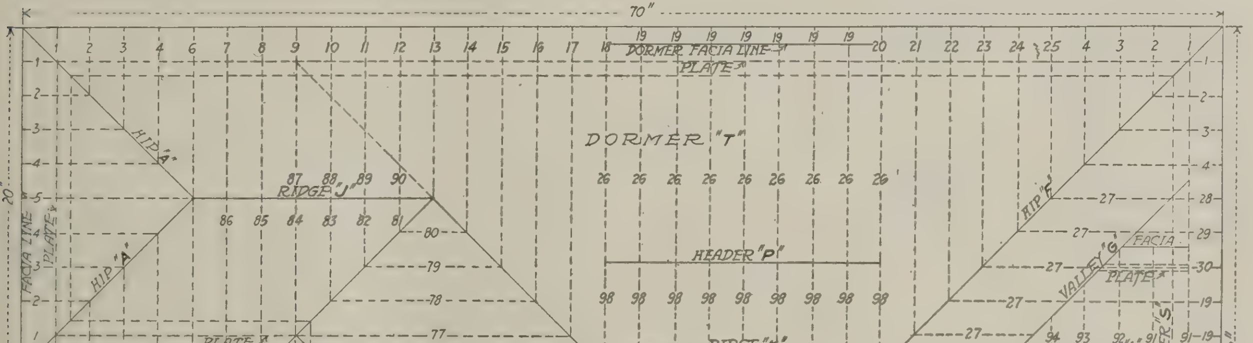
*By Richard M. Van Gaasbeek**

Part II

THE plate is framed out of square stock securely nailed together edgewise. This gives the building line. The measurements should be accurate and the frame braced perfectly square to insure proper fits of the rafters as they are laid out with the steel square. Lay off on the plate the position of each rafter as shown an the lay-out. This will save time in spacing when assembling and each rafter will readily seek the position intended for it.

Set the fence and square so that the 12-inch mark or the rise rests on the tongue and the 12-inch mark or run rests on the blade.

Mark on the tongue for all plumb cuts and on the blade for all level cuts. By laying out the rise (usually the shortest distance) on the shortest arm of the square or tongue and the run (usually the longest



Rafters are numbered.
Other members are lettered

FIG. 1
WORKING PLAN OF ROOF

distance) on the longest arm of the square, a mechanic is not likely to get confused as to which is the plumb or level cut. The unit for a 12 inch run is constant for all common, jack or cripple rafters throughout the roof, as the rafters are spoken of as rising so many inches in one foot. With the fence and square thus set, apply on the top edge of the stock to be used for the rafter and make the first line to the extreme left or facia line *A*, Fig. 6.

Take the run of the rafter from the lay-out, measuring from the facia line to the center of the ridge which will be found to be 10 inches. Measure this distance in on the stock from the facia line with the aid of the square and fence and produce a line parallel to it, or the extreme length on the center line *B*, (Fig. 6) measuring on a level line. From this a deduction must be made of one-half the thickness of the ridge *C-D* (Fig. 4) to get the cutting length of the rafter. Measure in on a level line this distance and produce another plumb *C* the required length. Again measure from the facia line *A* the width of the projection and produce another line parallel to it or wall line *D*. This completes all needed plumb lines. Measure down on the facia line *A* the width of the facia and produce the first level line *E*, or plancher level, measure up from the plancher level the distance developed as shown in Fig. 5 and produce a line parallel to it for the plate level *F*. This completes all level lines and the lay-out of the rafter. Cut on the line *A* for the facia, on the line *E* for the plancher level, on the lines *D* and *F* for the birdsmouth and the line *C* for the cut against the ridge. All other common rafters are laid out in a similar manner, taking the required run to each rafter from the lay-out.

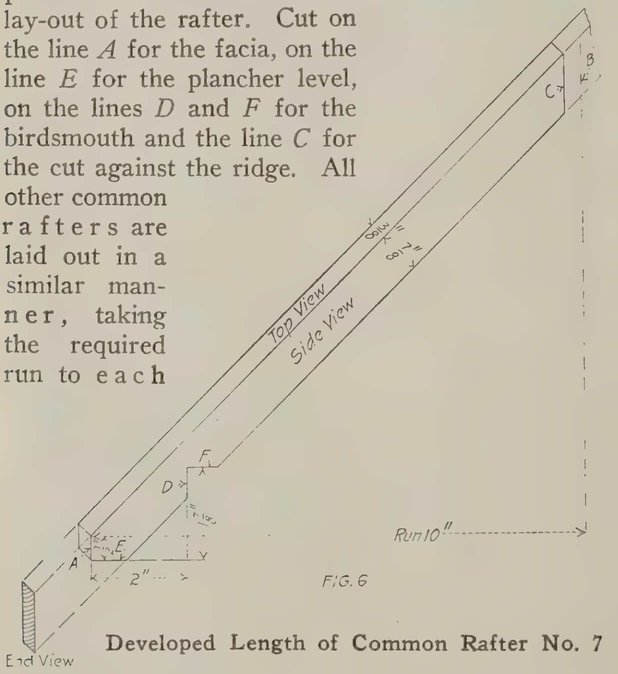


FIG. 6

Developed Length of Common Rafter No. 7

To lay jack rafter No. 4 set the fence and square as for the common rafter and produce the first plumb line to the extreme left for the facia *A* (Fig. 7). Take the run of the rafter from the layout measuring from the facia line to the center of hip *A*, which will be found to be 8 inches. Measure this distance in on a level line from the facia and produce another line parallel to or the extreme length on the center line *G* (Fig. 7). From this length must be deducted one-half the diagonal of the hip *G-H* (Fig. 4). Measure this distance in from the extreme length *G* and produce another parallel line *H* and square across the top edge and point off the center. The center of the top edge is the actual point obtained. To lay out the top cut so that it will fit against the hip at the proper angle produce another plumb line from the line *H* a distance equal to one-half the thickness of the stock used *I* and connect this point through the center as shown in the top view (Fig. 7). This cut can also be laid out with the steel square by using the length (bridge measure of the run and rise) on the blade and the run on the tongue. Mark on the length for the top cut. The first method is easier to understand and easiest to remember.

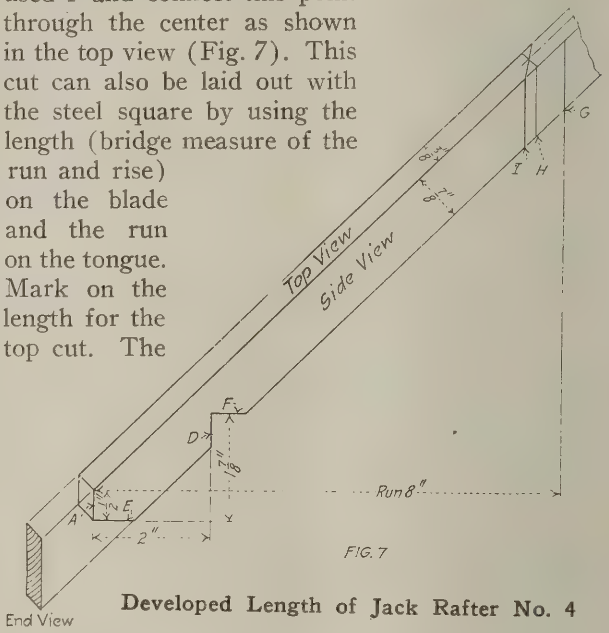


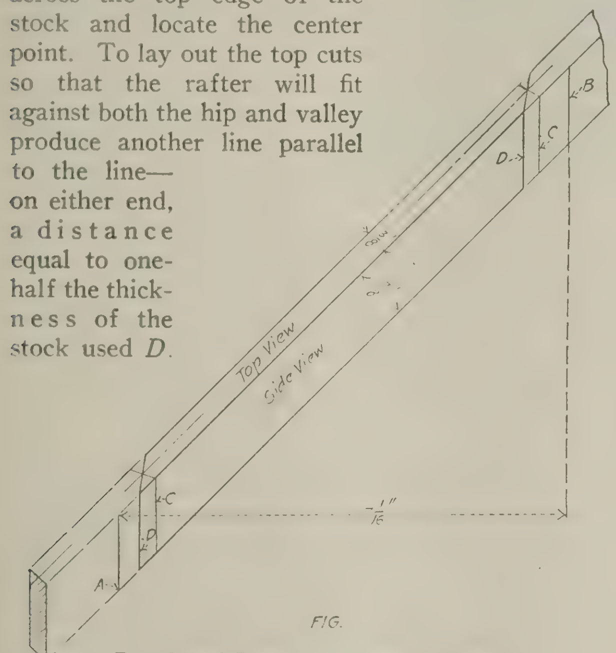
FIG. 7

Developed Length of Jack Rafter No. 4

To finish the bottom cuts measure in from the facia line *A* the width of the projection and produce another parallel line to it or wall line *D*. Measure down on the facia line *A* the width of the facia and produce the level line *E* or plancher level. Measure up from the plancher level the distance developed as shown in Fig. 5 and produce a line parallel to it for the plate level *F*. Cut on the line *A* for the facia, on the line *E* for the plancher level, on the lines *D* and *F* for the birdsmouth and on the angle on the top edge and the plumb line *I* for the cut against the hip *A*.

A cripple rafter such as No. 27 is laid out with the fence and square set as for the common and jack rafters. Produce the first plumb line *A* in Fig. 8. Take the run of the rafter from the layout measuring from the center of hip *F* to the center of valley

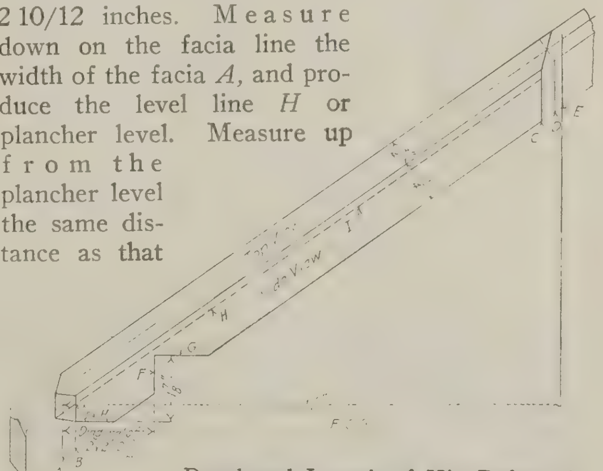
G. Measure this distance in on a level line from this previous line (Fig. 3) and produce another line parallel to it or the extreme length on the center lines *B*. From this length must be deducted one-half the diagonal of the hip on the top and one-half the diagonal of the valley from the bottom *G-H* (Fig. 4). Measure in from the extreme length on either end this distance and produce another parallel line *C* (Fig. 8) and square both lines across the top edge of the stock and locate the center point. To lay out the top cuts so that the rafter will fit against both the hip and valley produce another line parallel to the line—on either end, a distance equal to one-half the thickness of the stock used *D*. Connect these points through the center as shown in the top view (Fig. 8). Cut on the angle on the top edge and the plumb lines *D* for the cut against hip *F* and valley *G*. Care must be taken in laying out the top cuts to have them the proper hand, either right or left as required.



Developed Length of Crippled Rafter No. 27

The hip rafter runs diagonally with reference to the plates of the building and, in all roofs of equal pitch, crosses the plate at an angle of 45 degrees or the diagonal of a square. The unit for one foot run, therefore, differs from that used for the common, jack and cripple rafters, due to the fact that while the run of the common rafter is 12 inches, the hip runs the diagonal of 12 inches and 12 inches to reach the same rise, or 17 inches. To be exact, in a run of 12 feet about ⅜ inch would be lost, i. e., the diagonal of 12 feet and 12 feet is not 17 feet but 16:11 ⅝ inches. To lay out hip rafter *A* set the square and fence so that the 12 inch mark, or rise, or pitch as specified rests on the tongue and the 17 inch mark or run rests on the blade. Mark on the tongue for all plumb cuts and on the blade for all level cuts. The unit of 17 inches is constant for all hip and valley rafters throughout the roof. With the fence and square thus set apply on the top edge to be used for the hip and make the first plumb line to the extreme left or facia line *A* (Fig. 3. Take the run of the rafter from the layout measuring from the corner of the facia lines to the center of the ridge. This will be found to be 14⅛ inches. Measure in on the stock from the facia line this distance, and produce a line parallel to it, or the extreme length on the center line, *E* (Fig. 9), measuring on a level line. From this length must be deducted one-half the diagonal thickness of the ridge *A-B* (Fig. 4) to find the cutting length on the center line. Measure in on a level line this distance and produce another plumb line *D* (Fig. 3), squaring across the top edge and locating the center point. The center on the top edge is the actual point obtained. To lay out the top cut so that it will fit against the ridge at the proper angle, use the same method as that employed for the jack and cripple rafters. Produce another plumb line from the line *D*, a distance equal to one-half the thickness of the stock used *C* and connect this point through the center as shown on the top view (Fig. 9). To finish the bottom cuts measure in from the facia line *A*, the width of the projection and produce another parallel line to it or wall line *F*.

Notice that the hip runs the diagonal distance of the projection and not just 2 inches as in the common rafters. The distance from *A* to *F* is the diagonal of 2 inches and 2 inches or 2 10/12 inches. Measure down on the facia line the width of the facia *A*, and produce the level line *H* or plancher level. Measure up from the plancher level the same distance as that on the common rafters shown in the development (Fig. 5) and produce a line parallel to it for the plate level *G*. To make the turn at the corner of the building, square the facia line *A* across the top edge of the stock and locate the center. Measure in on a level line, one-half the thickness of the stock used *B* and produce another plumb line, square this line across the top edge and connect with the center as shown on the top view (Fig. 9). Cut on



Developed Length of Hip Rafter *A*

these angles on the line *A*, for the facia, on the line *H* for the plancher level, on the lines *F* and *G* for the birdsmouth and on the angle on the top edge and plumb line *C* for the cut at ridge end of rafter.

To back the hip it will be necessary to remove the corners of the hip rafters to bring the center line of the hip in alinement with the center line of the jack and common rafters. The center line of both the hips and valleys seek their natural position when laid out with the steel square. These lines must meet. If the hip is dropped or the valley raised, it throws this center line out of place. If dropped, the roof boards will have a bearing only on the outside edg of the rafter, unless blocked up in the center. Backing the hip gives a solid bearing for the roof boards and keeps the rafters in their normal positions. To determine the amount of stock to be removed in beveling the corners, produce a level line anywhere on the side of the rafter as at *H* (Fig. 9). From the top edge of the hip on this level line point off one-half the thickness of the stock used for the hip. Gauge a line through this point parallel to the top edge as at *I* Also gauge a line through the center of the hip on the top edge and bevel to these lines as shown in the end view (Fig. 9). If it is required to drop the hip instead of backing, proceed in the same way by producing a level line anywhere on the side of the stock. From the top edge of the rafter on this line point off one-half the thickness of the stock used. Instead of gauging through this point as in backing erect a perpendicular line. The length of this perpendicular from the level line to the top edge of the hip is the amount of stock that should be taken off the plate level. All other hips and valleys are laid out in a similar manner, taking the required run of each rafter from the layout.

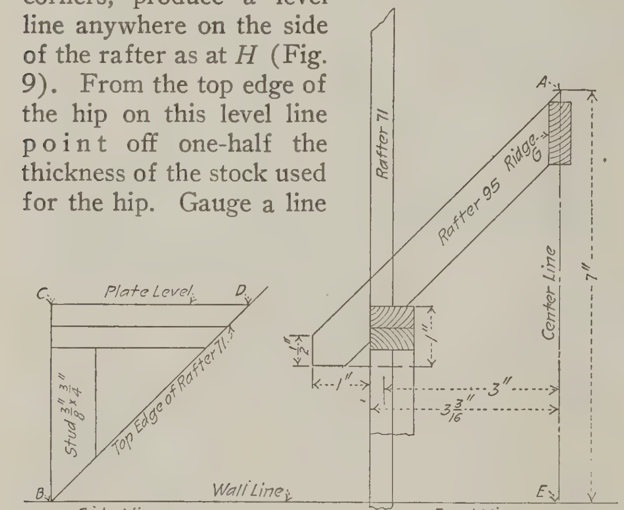


FIG. 10

Layout of Dormer *R*

(*To be continued*)

Prizes Awarded for Best Designed Houses

AWARDS have been made in Chicago by the judges in the national small house plan competition, held in connection with the national own your home movement, and under the approval of the American Institute of Architects.

A total of twenty-nine prize drawings were selected for cash prizes by the judges covering graded prizes for first, second and third designs in wood, brick and concrete stucco houses of four-room, five-room and six-room size.

The first prize for the brick house was awarded to Edgar and Vera Salomonsky, New York; first prizes on stucco and lumber houses both were awarded to L. Justement of Washington, D. C.

These prize-winning plans will be first shown at the first annual Own Your Home Exposition in the Coliseum at Chicago, March 26 to April 2. Real estate boards throughout the country are evidencing much interest in the Small House Competition and are cooperating in connection with the Own Your Own Home movement as sponsored by the National Association of Real Estate Boards.

The Philadelphia Real Estate Board has asked that an exhibition of the prize-winning designs be held there. Similar requests have been received from Boston, New Haven and the newly organized society, Art Center, Inc., New York City. The entire program has met with an agreeable and general response throughout the country.

At the Chicago Own Your Home Exposition a fac-simile of the first prize-winning house will be constructed of lumber, and the front elevation of the first prize-winning brick home is to be erected by exhibitors who have already been alloted space. One of the largest department stores in New York City will build a fac-simile home in its establishment. Other fac-similes and models will be seen at the third annual Own Your Home Exposition in New York City during the two weeks of April 16 to 30.

Are You Bothered With Weeds?

PROF. O. S. MORGAN, head of the College of Agriculture of Columbia University, suggests the following method of treating lawns in the East:

"As a good general treatment for soil in the East I would suggest that the ground be manured every other year at the rate of five tons to one-quarter acre. In the spring put on a dressing composed of ammonium sulphate, a small amount of nitrate of soda, a small amount of acid phosphate and potassium sulphate along with a relatively large amount of finely ground steamed bone. This should be used at the rate of 250 pounds to one-quarter acre. More lawns are spoiled by the watering pot style of sprinkling than anything else. Dribbles of water bring the grass up so that the roots are scalded. There should be a very large application of water, simulating a heavy shower, every three nights."

This three-room apartment house in Kansas City is so arranged as to give all the advantages of a six-room apartment.

The rooms are intended to give service twenty-four hours a day. Houses like this are doing a lot to relieve the housing shortage.

Small Apartments Made More Efficient

By Herbert C. Crocker

THE January issue of BUILDING AGE described some twelve-family apartment houses in Kansas City, Mo. Those apartments were built in two-room suites with the efficiency of four rooms and proved quite profitable as an investment. In the accompanying illustrations a type of apartment is shown that is becoming popular in St. Louis. These three-room apartments are arranged to give all the possibilities and conveniences of six rooms.

STRUCTURAL FEATURES

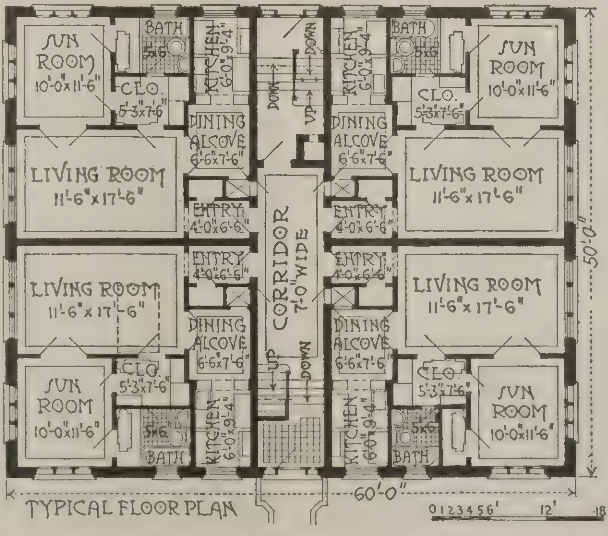
The structural details of the building are commonplace. A corridor divides each floor lengthwise and each of these sections is again divided by a wall. This arrangement permits four apartments on each floor. All entrances are enclosed. The outside is finished with brick and is without any ornamentation that would tend to increase the cost of building.

Each suite has a sun room, living room and a dining alcove and kitchen in combination. In-a-door beds in the sun and living rooms make it easy to convert these rooms into bedrooms at night. Considerable storage space is available in the closet provided for the bed.

Near the entrance hall is a large closet for wraps, umbrellas and other articles. The refrigerator is placed convenient to the dining alcove and an outside arrangement is provided for receiving ice.

GOOD SUNLIGHT AND VENTILATION

Mullion windows and French doors to the sun room and dining alcove provide plenty of light for the suite and the ventilation is excellent. The sun room has two outside exposures and is an ideal room for the entertainment of friends and visitors. Because of the large amount of window space this room can be thrown open and makes a choice sleeping porch at night.



How Each Floor Is Laid Out

The dressing closet is large enough for a dresser, chifforobe and wardrobe, when placed around two walls. Entrance to the bath is made through the dressing closet which more or less conceals it from view. There is easy access to the bath room from either the sun or living room.

Living Room in the Day

Bed Room at Night

The dining-kitchen is divided into two parts. The kitchen portion adjoins an exterior wall with light from an outside window. Ample working space is provided by the convenient arrangement of the stove, sink, cabinet and work table. Two china cabinets, each 4 ft. high with a plastered arch, separate the dining alcove from the kitchen. There is sufficient room in the alcove to seat six persons comfortably. Packages and other articles may be delivered through the opening at the refrigerator and may be reached easily from any part of the suite.

Refuse Disposal

Refuse, sweepings and garbage are deposited in the hopper door of each flue. They fall to the chamber in the basement and are burned there without further attention. The boiler and incinerator flues are operated in combination.

Five of these buildings, 60 ft. x 50 ft., have already been erected by Walter F. Sheehan. In all cases where the entrance is at the side, the lot must have a frontage of at least 60 ft. and on an inside lot the frontage should not be less than 70 ft. Each building represents an investment of $50,000, and the separate apartments are leased unfurnished at an average rental of $75 a month. The demand for such apartments has been great and they are being occupied as fast as they are completed.

Are Solving the Housing Shortage

Apartments such as these are in keeping with the spirit of the times. They are a good lesson in economy and in making every cubic foot of space count for something. The intention has been that every room shall serve some useful purpose twenty-four hours a day and that the idle space shall be reduced to a minimum. This type of house is already doing its share to relieve the housing shortage in the larger cities, and it really makes a comfortable place in which to live.

As a solution for high rents such houses have justified their existence many times over.

Sun Room in the Day

Bed Room at Night

What is the Situation in the Building Industry?

(*Continued from page 34*)

able basis, one which will justify the confidence of the public in its stability, the housing industry can be revised to a large extent.

Industrial Housing

Morris Knowles

Pittsburg, Penn.

THE most vital concern of industry is man power. The production of better goods and more goods must depend, now, as always, upon the energy, skill, efficiency and loyalty of the men who operate the machines, who inspect the product, who watch over the raw materials, who keep the entire plant attuned and in step.

Much has been done by well managed industries everywhere to better working conditions within the plant. Yet the average employee working eight hours per day, 300 days per year, actually spends only 27 per cent. of his time in the plant. Further, if the average family of five individuals has an average of one and one-half workers, then the actual time spent in the plant per family, is only 8 per cent. of the total.

In order that a man may be a normal, virile and effective citizen and worker, it is necessary that he have an opportunity to express or provide for all of the primitive instincts, of "First Laws of Nature," that are common to every one of us. These are, the law of self-preservation; demanding among other things, food, shelter and clothing; the law of reproduction of the race, or the instinct for family life; the law of self expression, which finds an outlet in creative work, the law of equal action and reaction, by which a man demands common justice; demands common justice; the law of imitation, from which springs the value of ideals. Man is further governed by the natural laws of health, which imposed among other things necessity for recreation, relaxation and play. Then there is the instinct of human companionship and the instinct for religion.

Living Standards

Address of Julia C. Lathrop

Chief Children's Bureau, U. S. Dept. of Labor

THE housing shortage is not a new problem in any country. It has always existed though it has not always been recognized. But until a solution is found which makes it possible for every decent family to obtain decent shelter, the question will not down in the United States, and since the standards of housing decency are not fixed but indefinitely progressive, the question will remain insistent for an indefinite period. Its answer will measure a nation's advance in social progress.

The principles of housing should be taught in our schools, high and elementary, and in our churches of every creed. Housing is as truly the concern of statesmanship as commerce, industry and agriculture, and international relations. No citizen should be able to escape some knowledge of what housing means and therefore what shortage means.

A housing shortage inevitably lowers living standards. Its effect upon industry is to lower the health, resistance, efficiency of workers and to repel workmen from localities where decent housing is unobtainable, or to make them restless and wretched if they find themselves tied to a location which gives them and their families less than a decent shelter in decent surroundings.

Real Estate Loans

Archibald M. Woodruff

Third Vice-president and Manager of Real Estate Loans, Prudential Insurance Company of America

WHILE we cannot overlook the demands made for increased transportation facilities—by industrial establishments for capital and by business generally for funds—still the calls made by the city home owner and the farmer are fundamental. We must have homes and we must have food.

If we love our country and hope to see growth and prosperity we must do what we can to encourage industry, thrift and home ownership among our people.

I emphasize industry and thrift as they must precede home ownership. We do not wish to see funds for the purchase of homes provided by our Government and we know of no mysterious source to which we could apply and have poured out an unlimited supply of funds. The investor in carefully selected real estate loans shows his loyalty to country, his willingness to help build up our great commonwealths and aid the would-be home owners in becoming good citizens.

Supply and Price Tendencies

Franklin T. Miller

Assistant U. S. Senate Committee on Reconstruction and Production

I HAVE been asked to speak on the question of supply and price tendencies of building materials and on the significance of the labor difficulties in the building industry. I do not believe that any figures are especially significant under the artificial conditions through which the building industry has been passing during the last two years. I believe that in order to decrease the cost of building, we must use our labor and our plants more continuously, and I believe that the continuous use of our labor and our plants will eliminate abuses which are inherent to interrupted use, I do not believe that the excessive cost of building can be absorbed by any form of government subsidy, and I believe that rent regulation will but curtail the supply of buildings. I believe that the country must depend upon private initiative. The problems which are confronting us are not susceptible of solution by the municipal or state governments, because they involve matters of transportation, fuel and the direction of credit, which are beyond the control of the municipality or the state. I believe that the Federal Government, which, in the interest of general welfare during the war, has brought about the interruptions which have reacted upon the public in the present housing and construction shortage, must now extend every facility of a sound and practical nature to maintain the continuity of the building industry, for it is only through the regular and continuous application of labor that the housing shortage can be made up at reasonable cost to the public.

Exemption from Taxation

Lawson Purdy.

Former President Board of Taxes and Exemptions, New York City.

THROUGHOUT the United States buildings are taxed as heavily as, and in most states more heavily, than any other labor product. With a 2½ per cent. tax rate on an assessment at full value the net rent must be about 1/3 more than if there were no tax. If the net rent equals 6 per cent. of the cost of the building the tax is 5½ per cent. of the net rent. At the present time, doubtless, there must be a prospect of a much higher net rent than 6 per cent. in order to induce building, but even if the net rent is 10 per cent. the tax is one-quarter of the rent. It is obvious that the tax is a very important factor. If the tax on new dwellings is remitted for a term of years a substantial inducement is offered to builders. How substantial that inducement is few people realize. I favor an exemption for a period of at least fifteen years. I think the present emergency warrants such an exemption.

Objections Are Met

Various objections are raised which seem to me without weight. First, it is said that such an exemption will reduce the assessment roll. It will not. No existing property is exempted. It is true that some houses would be built even if there were no exemption. These are all the houses that would be taxed if there were no exemption. If the exemption is effective, then to the extent to which it is effective houses will be produced that would not otherwise have been produced. They will be taxable after the period of exemption has passed. In the meantime, the erection of such houses will have caused a demand for land which will increase land values and so swell the assessment roll. In any event, the exemption of all buildings constructed for human habitation during the next three years for a term of fifteen years will affect very slightly the aggregate of the assessment roll.

It is said that it is unfair to the owners of existing buildings to exempt new buildings. The owners of existing buildings have seen the value of those buildings doubled by no act of theirs. In many cases the rent they can obtain is more than doubled. The value of those buildings will tend to be about what it would cost to reproduce them provided always they are suitable. It does not seem that there is any hardship to these owners of existing buildings in encouraging the production of new buildings costing twice as much.

Public Utilities

Philip H. Gadsden.

President American Electric Railway Association, Vice-president United Gas Improvement Co.

ONE of the most serious problems in connection with the housing situation in the United States today is the great need for money among public utilities with which to make extensions.

In order to properly equip the improperly housed residents of the United States with heat, light, transportation and telephone facilities, the public utilities today would have to raise a total of $852,500,000.

There is no hope on earth of ever getting these needed extensions if the credit of public utilities is not restored. The shortest step toward restoration of credit is for regulatory bodies to permit public utilities to earn such a return on their investments as will attract new capital into the public utility securities field.

I am not pessimistic, however, regarding the attitude of regulatory bodies. Throughout the country they are displaying a highly intelligent grasp of the situation and are evincing a desire to play fair with the public utilities. With the cooperation of regulatory bodies, public confidence in public utility securities can be restored, and with that confidence will come a flow of money into the public service field that will make extensions possible.

Standardization of Manufactured Products

Standardization Committee of National Federation of Construction Industries

By A. M. Maddock

IN the matter of standardization we also must keep in mind that the public must be considered. If we are going to avoid opposition from that source we must be prepared to show where they will be benefited. While the manufacturer no doubt will be prompted to establish certain standards for selfish reasons, it is nevertheless a fact that if he is benefited by being able to reduce his cost, competition is bound to reduce the selling price of that commodity and in this way the public will benefit by the saving.

Just what can be accomplished by Standardization and as proof of some of the ridiculous things we are likely to do, can best be illustrated by the story of a manufacturer of ploughs. He said there were some two hundred or more different patterns of ploughs and practically all manufacturers had that many designs. In addition to this, each pattern was made in two ways, which doubled the number. One was made to throw a right hand furrow and one to throw a left hand furrough. During the meeting of the plough manufacturers, the question arose as to why these two patterns of ploughs were made and to their amazement no one was able to give a reason or could show that one pattern had an advantage over the other. Certainly, they had calls for both patterns; some farmers preferred one and some the other. It was decided that they would eliminate the left hand pattern which immediately cut their line in half and I understand that they have had practically no objection after the farmer found that only the one pattern was made.

Standardization Not an Experiment

I feel sure that there are a number of things that we are doing in the construction industry which are just as ridiculous as the plough manufacturers were doing. It would seem to me that if some standards could be adopted by the door and window frame manufacturers so that in the majority of cases architects could work to these standards this would facilitate manufacture and would reduce stocks in the dealer's hands which in turn would reduce the cost of these articles, and, as I said before, competition will guarantee to the public that they would eventually be benefited.

We must not look upon standardization as some new experiment. Standardization has been accomplished in a great many lines and the general public, I believe, have received the most benefit. How many of you have ever thought what it would mean to us today if each automobile manufacturer made his own particular design of rim for tires? There is no question in my mind but what we would pay double or triple the price we are paying today and it is a question as to whether the tires would be as good a quality as they are.

The Upson Board Mill

THE picture below shows the plant of the Upson Company at Lockport, N. Y. This plant covers fifteen acres of land. All the buildings have been constructed gradually on the unit plan as the needs of the business have required and plenty of room has been reserved for future growth. They are massive in design and are of modern fireproof construction. The new addition, which comprises the buildings shown in the left half of the picture, is built of blended tapestry brick, with black mortar joints above the concrete line. These buildings are over 500 feet long and rest on solid rock with heavy concrete foundations.

The inside walls are of light gray brick, with white mortar, making light, cheery interiors. The roofs are of steel and gypsum. Creosoted wood blocks cover the floors wherever trucking is to be done but the remainder of the floor space is concrete.

Raw material is received at the south end of the plant, and from there travels in a straight line through the stock house to the beater or fibre preparation building, which is 114 feet long by 118 feet wide by four stories high.

General Layout

The main line shaft drive is on the first floor and to these pulleys are belted the machines on the second floor. On that floor are the beating engines

(*Continued on page* 59)

Plant of The Upson Company, Lockport, N. Y.

Letters From Readers

Ideas, Suggestions and Criticism Are Always Welcome

A Carpenter's Tool Kit

AN article in a recent issue of BUILDING AGE concerning the tools needed by the ordinary journeyman carpenter leads me to make a few suggestions. I have run the gamut from the old-time monstrous chest weighing from 400 to 600 pounds and needing a truck to move it from job to job and four men to handle it, down to the present-day practice of carrying only the "suit-case" hand box and the fewest possible tools. Possibly some of my experience might be of use to builders who want to know just what tools a carpenter must have.

The old-time chest contained a full set of framing and former chisels, gouges, gauges, half a dozen or more saws of various kinds, bits and augurs and a more or less large assortment of moulding tools, bead planes, etc., etc. These have now been superseded by combination planes and by fewer and more improved tools. Today it is the general practice for the carpenter to take only the tools actually needed on the job, keeping his extra tools at home and changing a few at a time as the progress of the work changes his requirements. The general practice in this section is for the men who start the building to stay through and complete the finishing, it not being usual for contractors to have "framing" gangs and "finishing" gangs to succeed one another as the work progresses.

TOOLS FOR ORDINARY WORK

For the ordinary run of work the journeyman will, of course, need a claw-hammer, and sometimes a hatchet, square, level try-square, sliding T-bevel, pair of compasses, and whetstones. All of these are standard tools scarcely needing detailed description further than to say that I recommend the framing square with rafter and jack-rafter lengths instead of the former board measure. I also find a combined try- and mitre-square with 12-in. sliding tongue, the most convenient, and much prefer a solid wood level to the metal ones or to one of glued-up stock. A solid wood, well seasoned and well soaked in linseed oil at first and occasionally afterwards, will be very little affected by dampness and less so by variations in temperature than metal. A combination fine and coarse whetstone will save space and weight in the hand-box.

For saws my experience is that the 26-in. will be found most convenient. An eight point cut-off will be found heavy enough for all but the heaviest framing. This with a six-point rip-saw and a twelve-point cut-off for finishing and a medium size compass saw will supply practically all needs.

PLANES

For planes I find an 18-in. iron plane with 2¼-in. iron heavy enough for all ordinary jointing and much lighter to carry than a larger one. A gage smooth plane with 2-in. iron and either a Gage or Bailey pattern wood bottom jack, plane with also 2-in. iron and a 7-in. iron block plane will make a good outfit. In buying a block plane I recommend the standard angle rather than either the low angle or skew angle patterns as better for general use. In jack planes if the work is generally on dry lumber and the "jacking" not too rough I prefer the gage pattern, but if the lumber is wet and the "jacking" heavy and rough the Gage throat is somewhat fine and the Bailey pattern will work better.

BRACE AND BITS

For bits and brace I recommend a ratchet brace, a screw driver bit and several twist drills for use with the brace for nail bits and holes smaller than ¼ in. I would also advise the purchase of a full set, ¼ to 1 in. by 1/16ths, Jennings pattern augur bits and a canvas case for carrying, although it may not be necessary to carry the full set at all times. There should be provided countersinks for both wood and metal. A tenon gage and a butt gage will be needed; also a ratchet screw-driver and a push drill and a couple of nail sets, large and small. For the push drill I prefer the pattern with a jaw chuck rather than those fitted with chucks to hold only drills especially made for them. For a number of years I have used small sizes of twist drills in the holders rather than the fluted drills furnished by the makers.

While there are many tools the carpenter can buy and will desire to own I think the foregoing will be found to comprise a well-selected and fairly complete kit for general use and it can easily be added to as needs require and experience dictates.—*G. L. McMurphy, Tacoma, Wash.*

Cheaper To Own Than Rent

The profits in real estate come from the mechanic and handy man type of tenants, instead of the so-called middle class. The mechanic, if a small repair is needed in his apartment, will make it himself. Out of season, when labor is plenty and cheaper, he will allow you to make improvements. In other words, he is fair to the owner, while the so-called middle class tenant thinks he is paying higher rent and he wants a small repair made demands immediate service, no matter what the cost. He will put an owner to any expense. And when the books are balanced you will find a much better investment in $20 to $30 flats rather than in the $50 apartments. The latter many times has shown 9% depreciation.

In buying property there are two conditions to consider. One is where a mechanic buys a home and can make his own repairs; in this case one flat pays all running expenses. He can count on a good investment on a 10% proposition, but a man who counts on hiring all repairs made should figure 15% in order to make it a safe 6% investment.

I have been in business about 43 years and I believe that *every man should own his own home.* Do not think that I am discouraging men from buying, for it is cheaper for a man to own his own home than to pay rent, for owners of property do not find it as necessary to keep changing decorations, etc., and are more careful. I have known owners not to re-decorate for ten and twelve years because of good care. Lastly, I will add that the Compensation Laws and the Income Tax Law have to be counted on and are an added expense to those contemplating building.

About 25% of tenants are fair to the owner, the other 75% make all the expenses they can and, of course, that depreciates the investment.

W. A. Dwyer, Buffalo, N. Y.

THE UPSON BOARD MILL

(*Continued on page 57*)

and refining machines. There are seven large beaters and four Jordans, which reduce ground wood and sulphite into a form suitable for the fabrication of the board.

The machine building is 400 feet long. In this building is located the seven cylinder board machine which has 90 driers and is 320 feet long, turning out board 108″ wide. At the wet end of the machine room is located a large overhead Shepard crane for removing the heavy rolls of the machine whenever occasion demands. At the finishing end, where the stock has been wound on large rolls, another Shepard crane picks up the huge rolls and conveys them to a scale for weighing. The rolls are then picked up again and dropped through an opening in the floor to trucks on the floor below, where they are hauled by tractors through a subway under the street to the laminating plant.

At right angles to the machine room runs a two-story building 40 x 120 feet, the first floor of which is utilized for storage. On the second floor there is a complete machine shop for repairing equipment used about the plant. This equipment is so complete that the largest machinery can be built or repaired, one lathe having a swing of 14 feet. In this building also is located the general stores room, while several sub-stores are located in various points about the plant.

The engine room is 70 x 85 feet. The equipment includes a Brownell Variable Speed Engine; two Erie Engines; a Hamilton-Corliss Engine, and a Crocker-Wheeler Generator Unit which supplies electricity for the plant. In addition there are smaller engines for the boilers, ventilating systems and other special purposes. The boiler house is 50 x 63 feet. There are two batteries of Wickes upright tubular boilers, producing nearly 2,000 boiler horsepower. The boilers are equipped with the latest devices, stoking and removal of ashes being entirely automatic and under the control of one man.

Every modern device for the comfort of employees throughout the plant has been adopted. The toilet fixtures throughout the plant are of the latest type, and Speakman showers located in every part of the mill provide good bathing facilities for the men employed there.

Farm Building Ventilation

BY C. L. ATWOOD.

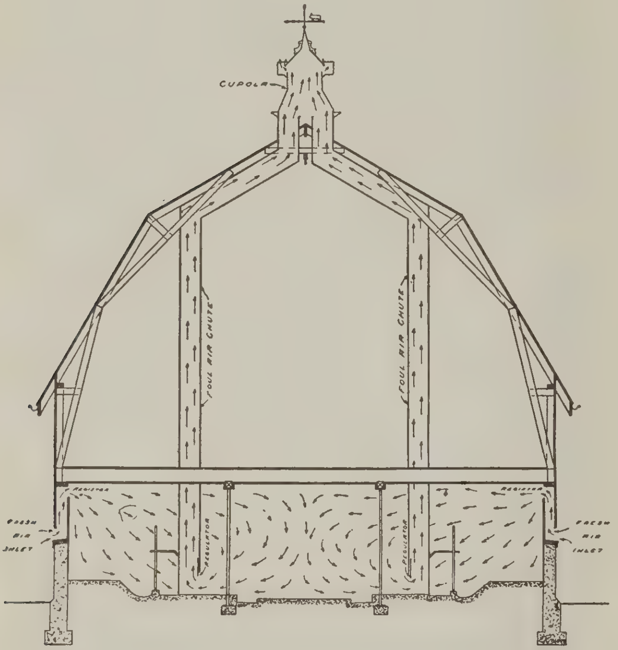
FARMERS are convinced that barns and hog houses especially, should be ventilated. They realize the importance of fresh air for live stock, but few have a definite idea of what adequate ventilation is, or how to get it. Contractors would do well to make the subject a study.

Roof ventilators are of primary importance as units in a complete ventilating system, but they do not give enough ventilation. If properly constructed they have a definite pumping capacity, but a correct system of intakes for fresh air is vitally important, if the used air is to be kept in motion and stagnation and re-breathing by the stock prevented.

The stale air of a barn or hog house is saturated with body moisture and when condensation occurs the impurities are spread about the interior of the building. The salty nature of this moisture removes the paint from the woodwork and metal equipment. It even penetrates the fibre of the boards in the walls, causing the exterior paint coat to peel and scale off.

One important thing in ventilation is to take the heavier air from the lower stratas, near the floor. Foul air hovers in so-called dead air pockets. Fresh air intakes and foul air flues must be correctly placed or these dead air pockets will not be eliminated.

There is a possibility, also, of short-circuiting the fresh air currents and placing the fresh air intakes so that incoming, vitalizing air is admitted at one side of the building only to pass out through openings in the opposite side that were intended as intakes. This sort of ventilation would be a failure. If the intakes were at a high level, the fresh air would pass over the heads of the stock without benefit, and if on a lower level, would subject the animals to a constant draft.



Arrows indicate courses of air currents

Correct ventilation means an even temperature and plenty of fresh air without draft. Ventilators must be active pumping stations. The forcible removal of the foul air induces fresh air through proper intakes. These should deliver the fresh air supply from the intakes to a point where it will be naturally inhaled by the animals.

The illustration shows a properly ventilated barn, one in which the temperature can be regulated and kept warmer in the Winter and cooler in the Summer. It can also be kept reasonably free from flies—that greatest of all barn pests. The tendency of modern dairy farmers is to Summer silo feeding, instead of pasturage, because the pasture land can be used at a greater profit in raising crops. By keeping the cows in a well ventilated barn, with shaded windows on the sunny side and closed doors, the barn can be kept cool and flies kept out, thus insuring a greater milk production.

Round metal flues are most efficient, sanitary and enduring, but should be made of rust-resisting metal. If square flues are used the corners afford dead air space, which causes condensation when the warm air passes through the colder atmosphere of the hay loft. Especially when wooden flues are used will this be noticeable. The mouth of a wooden flue will often be closed by ice, which forms gradually, from continual condensation. The wooden flue is unsanitary, because the pores take up the impurities in moisture from below, and when the pores are filled this moisture drips back into the barn. The swelling and shrinking of the wood, from atmospheric conditions and the moisture already noted, soon warps the wood, making the flues inefficient and practically useless.

Contractors who make a specialty of farm buildings would do well to get in touch with specialists in barn ventilation—manufacturers who furnish metal ventilators and flues of approved construction and furnish plans and blue prints to insure correct installation. The requirements of different barns are so varied, that no one but a ventilating engineer can afford to risk his reputation by installing a ventilating system and vouching for its efficiency.

Building Operations for January, 1921

	Class of Buildings											Increase over	Decrease under
	Residential		Industrial		Business		Public		Other		Total	Dec.	Dec.
Section of Country	Dollars	%	Dollars	%	Dollars	%	Dollars	%	Dollars	%	Dollars	%	%
New England	2,287,000	28	1,600,000	20	2,302,000	28	....	..	1,917,000	24	8,106,000	..	..
N. Y. State and Northern N. J.	8,640,000	40	6,132,000	28	3,567,000	16	....	..	3,296,000	16	21,635,000	10	..
Middle Atlantic	6,629,000	47	2,028,000	14	1,602,000	11	....	..	3,708,000	28	13,967,000	17	..
Pittsburg District	7,889,000	28	......	..	4,181,000	15	9,900,000	36	5,714,000	21	27,684,000	40	..
Central West	4,367,000	12	......	..	8,582,000	24	10,613,000	30	12,271,000	34	35,833,000	7	..
Northwest	944,000	26	......	..	....	..	849,000	18	2,789,000	56	4,582,000	..	slight
Total	30,756,000	28	15,429,000	14	20,561,000	18	24,186,000	22	20,875,000	18	111,807,000	11	..

Lumber Market Review

Stability in Construction Woods Has Begun, Inquiries are Increasing and Buying Is Better—Some Common Grades Stronger

FOR the first time in almost a year it may be safely said now that the lumber market has begun to stabilize. The tone of the market on some of the common grades of yellow pine, especially roofers, is actually showing strength and several of the roofer mills in the North Carolina pine territory have advanced prices $2.00 during the past week.

To all appearances, the bottom of the market on general construction woods, such as yellow pine, Douglas fir and North Carolina pine, has been reached and it is practically certain that the level of prices will be higher by April. On the other hand, white pine and cypress have been holding at too high a level and during the past month they have declined materially. Some of the better grades of these woods will probably drop further, but the lower grades are now fairly in line with their true value. Hemlock and spruce have weakened and there is a broad variance of selling price but the prospects for stability in these woods are brighter.

COMPARISON OF CURRENT WHOLESALE PRICES WITH THOSE A YEAR AGO

	March, 1920	February, 1921
Yellow Pine		
B. & Btr. F. G. Flooring, 2½" Face..	$125.00	$53.00
No. 1 Com. Dimension, 2x4"........	61.00	35.00
Long-Leaf Timbers, 12x12"........	72.00	58.00
North Carolina Pine		
Air-Dried Roofers, 5½"...........	61.00	29.00
No. 2 & Btr. Flooring, 2½" Face...	128.00	60.00
Douglas Fir		
No. 1 V. G. Flooring, 1x4"..........	117.00	70.00
No. 1 Dimension, 2x4".............	62.00	39.25
W. Va. Spruce, 2x4", 16'...........	63.50	48.50
Pennsylvania Hemlock, Base Price	57.00	48.00
Cypress Factory Selects, 4/4"......	105.00	85.00
Clear Maple Flooring, 13/16 x 2¼..	167.50	111.50
Clear Quartered Oak Flooring (White)	317.50	208.75
Clear Plain Oak Flooring (White)	232.50	138.75
Canadian Spruce Lath.............	21.00	8.00

The hardwood market is rather spotted. Some woods are firm while others are still dropping, but the common grades, as a whole, are about on rock bottom. Oak and maple flooring are showing a better tone than they have since last Spring.

The prospects of an early revival of building in New York and New England states received a temporary set-back a week ago by the blizzard and twelve-inch snowfall, which also interfered with lumber deliveries to consuming points in those states. In Greater New York, for instance, building was entirely stopped for several days and numerous cars of lumber accumulated at terminals in Brooklyn and Manhattan. Eastern retail yards, particularly the rural dealers, have begun to buy more liberally but the larger yards in the cities continue to hold out of the market. As a matter of fact, the city yards have much larger stocks on hand, comparatively, than the country yards and the latter are already beginning to see some Spring business and they are coming into the market for their requirements. The dealers are beginning to feel now that prices are about as low as they will ever be, at least for this year, and they can gain nothing by continuing to stay out of the buying market.

Those who have been following the trend of the lumber market closely explain that lumber was the last commodity to reach the peak and has been the first to return to normal. This, of course, refers to the market as a whole. Fluctuations in various woods will doubtless continue throughout the Spring and some of the better grades, which skyrocketed to unreasonable price levels, are bound to come down to their true value and to a level more in line with that of competitive woods.

The above table will prove interesting to anyone dealing in or using lumber in building construction. It shows the peak prices of last March and the prevailing prices today of a few representative items of lumber used in general construction work. The prices quoted are the wholesale values, delivered at New York City, the largest lumber-consuming market in the United States.

New Devices of Interest to Builders

A Space Saving Sliding Door

WE all get into a tight place some time, and under such conditions it is valuable to know how to get out.

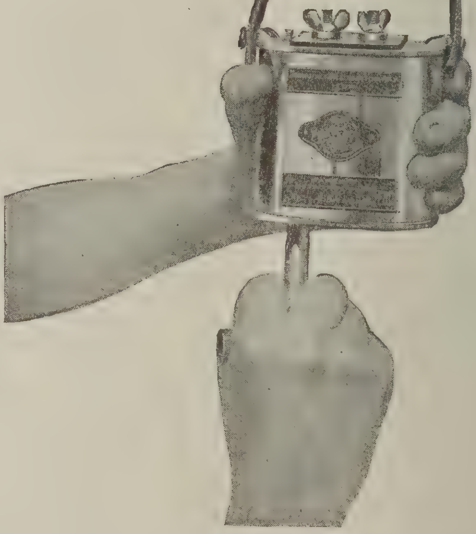
The Chief of the Pueblo, Col., Fire Department found his motorized fire truck in such a tight place when backed into the fire house that the swinging doors could not be closed. The solution of the problem was found by installing "SlydaSyde" hardware, which permitted the doors to be operated without touching the fire truck. The accompanying illustration shows the present conditions.

The door is automatically opened by counter weights when the latch is released by pulling a cord from the seat of the fire truck. The counter weights are suspended from one end of the cable attached at the top corner of the door, as shown in the picture, and run over a pulley fastened at the side wall. These weights travel up and down in a vertical pipe, also shown in the picture. They rest on packing in the bottom of the pipe when the door is in the open position. A 6 in. removable section of this pipe is provided at its base so that any possible difficulty in connection with the weights may be conveniently and quickly rectified by taking out the section of pipe, which is accomplished simply by unscrewing a couple of unions. This opening is 20 ft. wide and is closed by two 10 ft. sliding doors.

Further information regarding this type of door hardware, including illustrations of various applications, and plans showing installation of hardware and operation of doors, may be had from the manufacturers, Richards-Wilcox Mfg. Company, Aurora, Ill.

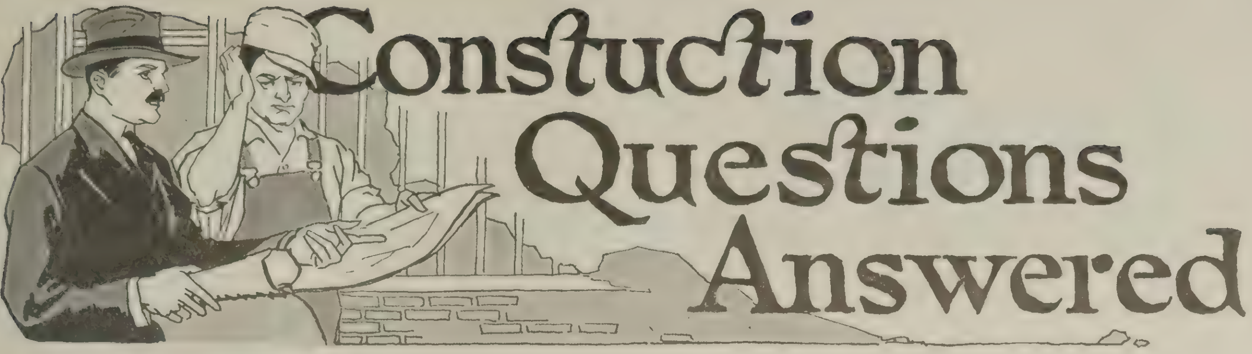
The Davis No. 1 Blaster

There are several practical reasons why charges should be fired by the electric method—any one of which more than justifies its use. The blaster is at a safe distance from the shot when he fires it. He can time the blast to the second—no time is lost waiting for fuse to burn. Hang fires and misfires are practically eliminated. For blasting in wet work the electric method is more reliable. Moisture cannot penetrate an electric blasting cap nearly so quickly as it can a blasting cap crimped to fuse. By firing several shots simultaneously a greater amount of work is done by the explosive—one charges helps the other.



The Blaster is small, compact and reliable

The new Davis No. 1 blaster is a small, lightweight (weighs only 3¼ lbs.) blasting machine. It is very powerful for its size, developing ample current to fire five 30-foot copper wire electric blasting caps or five 6-foot iron wire electric blasting caps, connected in single series. This blaster is particularly suited for coal mine blasting and at all operations where not more than five shots are fired together, and is also well adapted for agricultural blasting. The Davis No. 1 blaster is manufactured by the Atlas Powder Company, Philadelphia, Pa.



Constuction Questions Answered

ESTIMATING HOLLOW TILE

As I am a subscriber to your excellent paper, I would like to suggest that you publish some data on the estimating of hollow building tile in an early issue of Building Age.—R. O., Audubon, N. J.

Take the length of each outside wall in feet and multiply by the height in feet, which will give the superficial area in square feet, and then deduct for all window and door openings which are over 4 sq. ft. in size. This will give the net area of each wall, which, added together, will give the total net area of wall surface.

In the illustration shown,. A and B are the same length and C and D are same length, so we get:

		Sq. Ft.
Walls *A* and *B*	2x36′—0″x14′—0″	1,008
Walls *C* and *D*	2x28′—0″x14′—0″	784
Gables *C* and *D*	2x28′—0″x 5′—0″	280
Total		2,072

Deductions for windows and doors:

		Sq. ft.	
2 doors	3′—0″x7′—0″	42	
1 window	6′—0″x5′—0″	30	
1 window	5′—0″x5′—0″	25	
3 windows	4′—0″x5′—0″	60	
2 gable windows	3′—0″x3′—0″	18	
			175
Total net area in sq. ft.			1,897

Now, 1,897 sq. ft. equals the total net area or superlcial feet of all walls.

In order to convert this into the number of tile required, we first determine the thickness of the wall and the size of tile required.

Assuming an 8x5x12 tile was to be used in an 8" wall side construction, we would multiply 1,897 by 2.4, which equals 4,552.

Also, if a 12x12x12 tile was to be used in a wall 12" thick and construction, we would multiply 1,897 by 1, which equals 1,897, the number of tile required for the courses 12" high.

TABLE SHOWING REQUIRED NUMBER OF TILE IN A SQ. FT. OF WALL AREA, ALLOWING FOR AMPLE OVERAGE.

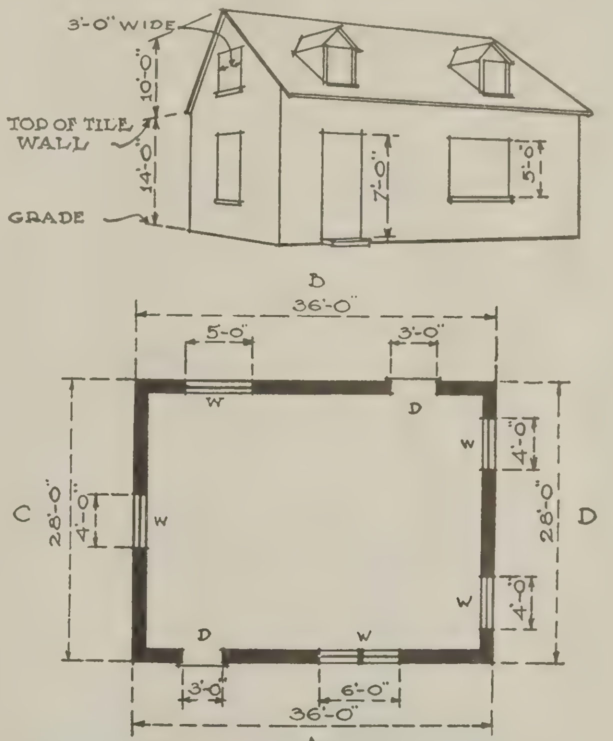
Sizes of Tile.	Wall						
	3 in.	4 in.	5 in.	6 in.	8 in.	10 in.	12 in.
4x 5x12 Side const.	...	2.4	3.0	...	...	...	(2.4)
8x 5x12 Side const.	...	...	1.5	...	2.4	...	(2.4)
3x12x12 End const.	1.0	...	...	...	...	...	4.0
4x12x12 Endcons t.	...	1.0	...	...	...	...	3.0
6x12x12 End const.	...	...	...	1.0	...	...	2.0
8x12x12 End const.	...	...	...	...	1.0	...	1.5
10x12x12 End const.	...	...	...	...	...	1.0	1.2
12x12x12 End const.	...	...	...	...	...	...	1.0

NOTE: A 12 in. wall side construction may be built up by bonding 4x5x12 and 8x5x12 tile together.

The quantity of corners, joist course, sill, lintel and jamb or closure tile should be figured separately and deducted from the straight wall area.

If the tile units are to be laid on the side, closures and half-closures will be necessary at the jambs of all straight openings unless these are to be closed by filling the ends of the tile with concrete. Where recessed box window frames are used, jamb tile and half-jamb tile will be required.

Some form of tile will be required for bonding the corners in any event, and also some form for providing a bearing surface for joists and some form of tile for lintels will be required unless the regular straight wall tile is used by filling with concrete and reinforcing them for lintels.



Taking off Measurements

In determining the quantity of lintels required for window and door openings, we add together the length of each window and door opening, alowing at least 6" bearing on each side of these window and door openings for the lintel to rest upon.

2 doors	3′—0″ long	8′—0″
1 window	6′—0″ long	7′—0″
1 window	5′—0″ long	6′—0″
3 windows	4′—0″ long	15′—0″
2 windows	3′—0″ long	8′—0″
Total		44′ 0″

This total represents the lineal feet of lintel section required.

Figure also the lineal feet of sills from actual openings, keeping door and window sills separate where a hollow tile sill is to be used. Frequently, however, the wood sill of window frames is set directly on the tile wall and no other shape provided or required for this purpose excepting where the tile are set on end. A course of tile slab should be used under all frames to cap off and close the cells in the tile, when tile are laid with cells vertical.

		Lin. Ft.
Door sills	2x3	6
Window sills	1x6	6
Window sills	1x5	5
Window sills	3x4	12
Gable window sills	2x3	6
		35

This total represents the lineal feet of sill section required.

The vertical lineal feet of jamb for all plain openings is figured for closures and vertical lineal feet of recessed box frame openings for jamb tile.

Where straight wall tile is used for regular lintels, the item for regular lintels is disregarded, otherwise this item would be deducted at an equivalent area in square feet.

Window and door sills, if included, would be deducted at ½ sq. ft each. Area of jambs to be deducted by averaging the jambs and half-jambs to equal ¾ foot per lineal foot. Closures and half-closures would be similarly averaged. Corner tile will be equivalent to ⅔ to 1½ sq. ft. per lineal foot. Joist course is usually taken to equal one square foot per lineal foot.

When the corner tile are different from the regular wall tile and are to be deducted, the side and end are to be measured.

These items for the house shown on our sketch will be as follows:

Window and door lintels	44 lin. ft.	=	44
Door sills	6 lin. ft.	=	3
Window sills	29 lin. ft.	=	15
Jamb	62 lin. ft.	=	46
Closures	28 lin. ft.	=	21
Corners (4x14)	56 lin. ft.	=	56
Joist course (2x36)	72 lin. ft.	=	72
Total		=	257

Thus we will have approximately 257 sq. ft., to deduct if all these items were to be provided for, giving the reduced area of straight wall tile as 1,897 minus 257=1,640, multiplied by 2.4=3,936 pieces.

Now then, our completed quantities will read:

3,936 pcs of wall tile
44 lin. ft. lintel
6 lin. ft. door sills
29 lin. ft. window sills
62 lin. ft. jambs
28 lin. ft. closures
56 lin. ft. corners
72 lin. ft. joist tile

The above has been taken from the Handbook of Hollow Building Tile Construction and we believe presents the matter briefly and clearly.

CEMENT FLOORS IN COLORS

I would be glad to read in an early issue of your valuable magazine, your expert advice on materials and methods of constructing cement floors in porches and sun rooms, in colors.—L. G. B., Rutland, Vt.

In constructing cement floors in colors, it is the usual practice to leave the foundation about 2½ in. below the finished floor. Then a 2 in. bed of concrete is poured on the foundation. A mixture of Portland cement, sand and marble chips is then spread on this to a depth of about 1 in. This is rolled and worked into the top until the proper finished grade is obtained. The surface may be polished after the cement is hardened and color effects are produced by using the desired color of marble and by colored cement. The table given below shows the proportions of various colors ordinarily used:

COLOR REQUIRED FOR VARIOUS MIXES OF CONCRETE
(Based on 1-2 Mortar).

Cut 6 ems

Material.	Color produced by— ½ lb. per 100 lbs. cement.	4 lbs. per 100 lbs. cement.
Lamp black	Light slate	Dark blue slate
Prussian blue	Light green slate	Bright blue slate
Ultra marine blue	....	Bright blue slate
Yellow ochre	Light green	Light buff
Burnt umber	Light pinkish slate	Chocolate
Venetian red	Slate, pink tinge	Dull pink
Red iron ore	Pinkish slate	Light brick red

Care must be taken to get colors that are not chemically affected by the cement and these colors should be obtained from a reliable manufacturer of cement colors and be used strictly in accordance with his instructions.

Nearly all color pigments destroy the action of cement to a certain extent and it is, therefore, not advisable to use them in great proportions.

When small broken stones are used in colored floors, the stones may be soaked in linseed oil for several hours. This will make their color brighter. Sometimes for flat panels in floors, the stones are glued on paper, face down, with gummed arabic. The surface mortar bed is then laid and the design is turned upside down and laid on the wet surface, pressing it down and leveling it with a heavy block. The paper then can be soaked off.

DAMP PROOFING CEMENT WALLS

I have a house, the walls of which I wish to waterproof. This is a brick house, with brick laid on the ground. I was thinking of furring out and plastering the walls. I thought that if the walls were dried out next summer and then painted well on the outside, they would be all right. The house is amply warm enough. The walls get damp about 3 ft. from the floor down to the floor. The ground is dry under the house. I could cement the foundation up to the joints, but I cannot get anything under the walls very well. I would like your advice in this matter.—F. G. C., Emmett, Idaho.

Dampness of cement or brick walls is due to the porous condition of the material and the capillary action that takes place and absorbs moisture from the ground. Probably the best method for treating your walls would be to wait until they are more or less dried out in the summer and then spray the surface with a 25 per cent. water solution of zinc sulphate. This solution may be prepared by dissolving 3 lbs. of zinc sulphate crystals in every gallon of water.

Paint Manufacturers' Association of the United States has conducted tests and these tests indicate that when cement surfaces have been treated in this manner, they may be painted with even more lasting results than wet surfaces. It is best to use a paint having a lead or zinc base and made of linseed oil. We feel that if you treat these walls in this manner, they will dampproof.

March Winds and April Showers

set the farmers to thinking about *STORM-PROOF DOOR HANGERS*

Long service records have made the National Storm-Proof Door hangers a favorite among the more progressive farmers.

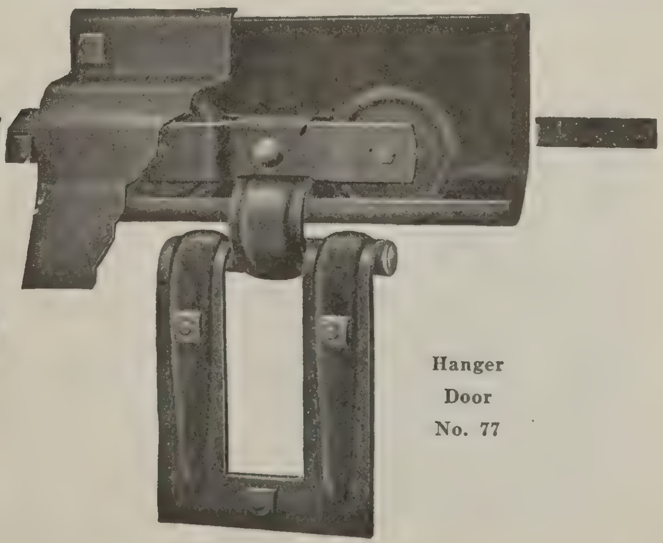
After many years in daily use, NATIONAL DOOR HANGERS may be found still giving the same dependable service, whereas in the meantime other hangers have ceased to function and have been relegated to the scrap heap.

The Flexible Hinge Joint eliminates vibration and protects the door from breaking by giving it "play" should anything bump against it.

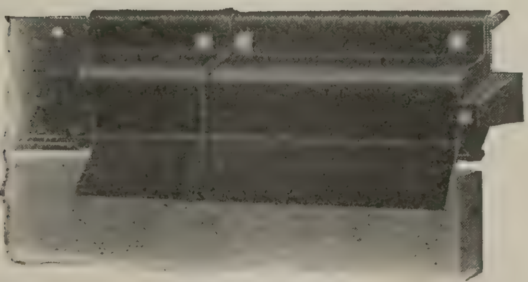
They are easy to install.

Send for catalogue and give dealer's name.

National Mfg. Company, Sterling, Illinois



Hanger Door No. 77



Storm-Proof Rail

New Catalogs and Publications

New Catalogs

These catalogs may be secured direct from the manufactuer. If you prefer, write the date of this issue and the numbers of any catalogs on a postal and mail it to "Building Age," 243 West 39th Street, New York City, The catalogs will be sent you without charge or obligation.

435. **Cut Alteration and Repair Costs.** The General Fireproofing Company, Youngstown, Ohio.—Pamphlet illustrating and describing the advantages and uses of Self-Sentering and Trussit. Self-Sentering is a ribbed expanded metal reinforcement for concrete, which makes unnecessary expensive wooden form-work in concrete roof and floor construction. Trussit centers in the concrete slab, reinforcing it equally from both sides. It is especially adaptable for partition and curtainwall work. Special literature and samples of both these materials will be sent on request.

436. **Standard Motor Trucks.** Standard Motor Truck Company, Detroit, Mich.—Illustrated folder pointing out the advantages to be gained by building contractors from the use of motor trucks in general and from Standard trucks in particular. The construction and design of Standard trucks are described in detail. Various illustrations show Standard trucks in actual operation.

437. **Homes of Comfort.** Crane Company, Chicago, Ill.—Booklet illustrating and describing the Crane line of goods which may be procured through plumbing and heating contractors. Photographs show the various lines of bathroom equipment manufactured by this company, as well as some of the heating equipment.

438. **Ornamental and Architectural Brass, Bronze and Metal Work.** The Newman Mfg. Company, Cincinnati, Ohio.—Catalog showing photographs of bank, theatre and cafeteria installations of Newman fixtures. It also contains lists of standard and special articles manufactured by this company in all metals.

439. **Oak Flooring for Factories and Warehouses.** Oak Flooring Mfrs. Association, Chicago, Ill.—Illustrated booklet pointing out numerous convincing reasons for the use of oak flooring for factories and warehouses. A few testimonial letters from owners of factories and warehouses in which oak floors have been used are reproduced.

440. **Factory Plumbing.** The Trenton Potteries Company, Trenton, N. J.—Booklet devoted to showing the latest improvements in the "Tepeco" line of factory lavatories and sinks. Contains many illustrations. Prices are given.

441. **Ross Heaters.** Ross Heater & Mfg. Company, Inc., Buffalo, N. Y.—Catalog F illustrates and describes the various types of heaters, condensers, expansion joints, coolers and airjector pumps manufactured by this company.

442. **Suggestions and Data for the Home Electrical.** Habirshaw Electric Cable Company, New York City.—Very helpful book containing many good suggestions for the prospective home builder. A study of each room of the house is made with respect to the electrical equipment for that particular room. Fully illustrated by photographs and electrical plans, showing locations and types of electrical outlets. Various practical electrial appliances are described and illustrated.

443. **Working Specifications and Details.** The Bishopric Mfg. Company, Cincinnati, Ohio.—Specifications and detailed drawings covering the application of Bishopric Stucco Base, Bishopric Plaster Base, Bishopric Insulating Base and Bishopric Sheathing. The specifications are very complete and the detailed drawings show proper method of application.

444. **Screw Holes.** Stine Screw Holes Company, Waterbury, Conn.—Literature thoroughly describing and explaining the service of this unique invention. It is stated that screw holes can be used in practically any material without damage to that material and will securely hold anything applied to them.

445. **Radiator Enclosures.** Tuttle & Bailey Mfg. Company, New York City.—Attractive booklet describing and illustrating the Radi-Grille manufactured by this company. The Radi-Grille is intended to screen the rather unsightly radiator without in any way impairing its heating efficiency. It can be furnished in many artistic designs to meet any size and condition of radiator construction.

446. **Clark's Emergency Exit Door Locks.** Hugh Elmer Clark & Brothers, Rochester, N. Y.—Folder illustrating and describing the different styles of exit locks made by this company. Several school, theatre and factory buildings equipped with these exit door locks are reproduced.

447. **For Your Home.** The Steam Corporation, Chicago, Ill.—Leaflet illustrating and describing the construction and operation of the Nokol oil burning equipment which, it is claimed, does the work of coal in a better way. The many advantages of this equipment over the use of coal for house heating are emphasized. A few houses in which Nokol has been installed are shown.

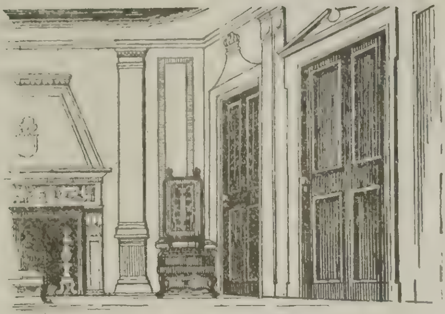
448. **"Minerva" Fountain Ruling Pen.** Kolesch & Company, New York City.—Circular illustrating and describing this fountain ruling pen which can be used with any ink, will not leak or clog and requires only one filling for a day's work.

449. **Frame Construction Details.** The Architectural and Building Code Service, National Lumber Mfrs. Assn., Chicago, Ill.—Bound volume containing a series of plates showing correct and economic types of frame construction. A fee of $1.00 is charged for this book.

450. **Southern Pine. What It Is and What It Is Used For.** Southern Pine Association, New Orleans, La.—Illustrated pamphlet containing technical and general information concerning the production, adaptability, physical properties, etc., of Southern Pine.

451. **Bostwick Metal Lath.** Bostwick Steel Lath Company, Niles, Ohio.—Illustrated catalog covering the complete line of Bostwick metal building materials. Several detail drawings are included. Specifications for both etxerior and interior metal lathing are given.

452. **Build the Hollow Wall Way.** Universal Cement Mold Company, North Milwaukee, Wis.—Illustrated circular explaining the use of the molds manufactured by this company, which, it is stated, are the strongest, lightest, simplest and most perfect.



Promoting Harmony

THE beauty of a room depends upon the selection of all its appointments to produce harmony. The value of McKinney Anti-Friction Butts lies in their ability to swing great doors quickly and quietly—without sagging or squeaking. They contribute harmony by serving unobtrusively—without notice.

McKinney Anti-Friction Butts are designed particularly for heavy work. Every day on millions of doors they prove their worth by work effectively done in silence. Other McKinney Hinges and Butts have been designed with equal thought for the task to be performed. From the smallest to the largest, they combine true craftsmanship with practical everyday usefulness.

The first McKinney Hinge was introduced more than fifty years ago. The millions that have followed since all represent the effort of the McKinney Manufacturing Company to make a good and substantial product. Today McKinney Hinges set a standard by which all hinges may be judged.

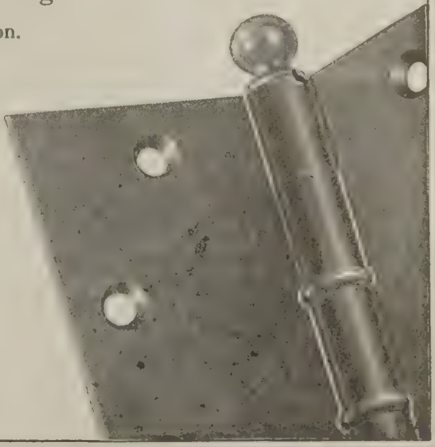
The selection of hinges for the home is clearly presented in a booklet for your convenience. You will also be interested in another pamphlet on hardware for garage doors of all kinds. This material will greatly aid you in selecting proper hardware to blend with architectural designs. These booklets and the McKinney catalog will be sent upon request.

McKINNEY MANUFACTURING CO., Pittsburgh

Western Office, State-Lake Bldg., Chicago. Export Representation.

McKINNEY
Hinges and Butts

Also manufacturers of McKinney garage and farm building door hardware, furniture hardware and McKinney One-Man Trucks



453. Knives. The L. & I. J. White Company, Buffalo, N. Y.—Booklet illustrating and describing the different types of knives manufactured by this concern for use in various industries.

454. Hydrated Lime in Concrete Roads. National Lime Association, Washington, D. C.—Illustrated Bulletin K-2 gives the results of actual field tests conducted to determine the effect of hydrated lime on the strength of concrete when used for highway purposes, which, it is claimed, is a very beneficial one.

455. Bondsit. A. C. Horn Company, Long Island City, N. Y.—Illustrated circular describing this product which is an aid in bonding old and new concrete for use in topping for cement floors, cement floor finish after the rough concrete has been placed, plaster or stucco work on concrete or cement surfaces, waterproof constrution, applying a cement wash, etc. Specifications for the use of Bondsit are given.

456. Shearing Stresses in Reinforced Concrete Beams. Engr. Dept., Truscon Steel Company, Youngstown, Ohio.—Illustrated book giving a complete analytical comparison between loose stirrup designs and beams reinforced with rigidly connected shear members. Some of the subjects discused are: Requirements of Beam Design; Cost of Steel and of Handling; Stress Lines; Designing of Shear Members and Anchorage of Shear Members. Discussions and tables of many tests are also given. The two appendixes deal with the Anchorage of Web Reinforcement and Bond Stress.

457. Architectural Granite. National Building Granite Quarries Association, Inc., Boston, Mass.—No. 1 of the Granite Series is extensively illustrated and gives the architectural uses of granite. Typical details showing economical designs for granite work are reproduced. Specifications for the use of granite are included.

458. Wasco Garage Heating System. W. A. Schleit Mfg. Company, Syracuse, N. Y.—Attractively illustrated book describing in detail the manner of installation and operation of the Wasco garage heating system made for private garages with capacities of from one to ten cars. The advantages to be derived from the use of this garage heating system which comes ready to set up, are listed. Several testimonial letters are included. Prices are also given.

459. Multiwhirl Subcooling Condenser. The Griscom-Russell Company, New York City.—Illustrated circular describing the construction, operation, uses and advantages of this multiwhirl subcooling condenser designed for use in oil refineries, particularly for the condensing and subcooling of gasoline, kerosene or any other vapors encountered in the refining process.

460. Blabon Art Linoleums. The George W. Blabon Company, Philadelphia, Pa.—Pocket size pattern book containing colored illustrations representing the entire 1921 line of Inlaid and Printed Linoleums—"Invincible" Battleship and Plain Linoleum, Cork Carpet, "Korsho Linoleum Rugs," "Var-Cloth" and "Feltex"—manufactured by this company. Several photographs of interiors are shown in which "Blabon" floors have been laid. Interesting information concerning linoleum is given, including directions for handling and laying it, cleaning and preserving it, etc.

461. Automatic Sash Holders. Hardware Sales Company, Inc., New York City.—Illustrated folder pointing out the advantages of these automatic sash holders, which replace sash weights, cord, pulleys, balances, etc., and do away with window pockets, rattling and attendant nuisances. Prices are given.

New Publications

The Atlas Handbook on Concrete Construction.

The Atlas Portland Cement Company, New York City.

This book is bound in cloth, and contains 144 pages, 4″ x 6½″, of solid information on concrete mixing, reinforced concrete, concrete, concrete forms, concrete building construction. The information included in this booklet is well illustrated by 135 pictures and 40 tables. It is classified for ready reference in both a table of contents as well as an alphabetical index.

The chapter on concrete mixing gives valuable tables, information on methods and tests, etc. This is followed by a discussion of reinforcements, taking up beams, girders, floor slabs, etc. Bending steel reinforcements receive considerable attention. The discussion of the building of typical concrete forms is good.

The Housing Book.

William Phillips Comstock. Cloth; 8½x11; 124 pp. The William T. Comstock Co., New York City, publishers.

This work is very fully illustrated and features housing developments at eleven different localities. The houses shown vary from one- and two-family buildings to nine-family apartment houses. The photographs and sketches are accompanied by floor plans. Several pages of text accompany the illustrations of each development. Some of the sites were developed as part of the Government's war housing program and others were erected for the purpose of providing houses for employees of large industrial concerns. The houses shown are mostly of the type now commonly termed "workingmen's homes."

Blueprint Reading, or Interpretating Working Drawings.

E. M. Wyatt, Manual Training Supervisor, Houston, Tex. Cloth; 6¼x9; 86 pp., including 29 plates. The Bruce Publishing Co., Milwaukee, Wis., publishers.

The ancients inscribed their history in stone with a language of pictures. For centuries these curious engravings remained unintelligible. Today archeologists have interpreted these writings, and they become an intelligent record of events. There still survives, however, a picture language, read by craftsmen of all nationalities. This is mechanical drawing. To those unfamiliar with its principles it may be as unintelligible as the ancient hieroglyphics, and must be learned by those engaging in those trades where it is employed.

The book bearing the title given above undertakes to present the fundamentals of this trade language for the benefit of artisans who must read, but who are not interested in writing it. It is a complete manual and has been developed as the result of the author's experience in teaching to classes of carpenters, masons, electricians, machinists, etc., the fundamentals of interpreting working drawings. The table of contents enumerates the following: I, Introduction; II, Kinds of Drawings; III, The Theory of Orthographic Projection; IV. Meaning Various Kinds of Lines; V, Foreshortened Lines, Inclined Surfaces, Auxiliary Projection; VI, Scale Drawing, Dimensions; VII, Breaks, Representing Drawings as Broken; VIII, Sections; IX, Bolts, Screws, Threads, Machining or Finish; X, Rivets—Structural Steel; XI, Architectural Conventions; XII, Study of a Set of House Plans; XIII, Study of the Bench Grinder. The book contains 29 full-page drawings treating mechanical objects, sections of machinery and architectural conventions.

Is a Building Any Better Than Its Roof?

NOTHING detracts so from the appearance of a building as a homely roof. Nothing proclaims inferior construction so quickly and unmistakably as a roof of poor quality.

Much of your reputation for dependability depends upon the roofs that cover the buildings you build.

By recommending Barrett Everlastic Roofings you assure your customer of satisfaction. You give him a beautiful, economical, long lasting roof, its quality backed by the Barrett Company's sixty years of successful experience.

And Everlastic's low price, freedom from waste, absolutely uniform quality and ease of laying means money saved on the job for *you*.

Barrett Everlastic Roofings are carried by enterprising dealers everywhere. Made in roll or shingle form, plain surfaced or surfaced with crushed slate, red or green, there's a style of Everlastic for every type of steep-roofed building.

The Barrett Company

New York Chicago Philadelphia Boston St. Louis Cleveland
Cincinnati Pittsburgh Detroit New Orleans Birmingham Kansas City
Minneapolis Dallas Nashville Syracuse Seattle Atlanta
Duluth Salt Lake City Bangor Washington Peoria Lebanon
Youngstown Milwaukee Toledo Columbus Johnstown Latrobe
Bethlehem Elizabeth Buffalo Baltimore Omaha Richmond Houston Denver Jacksonville

THE BARRETT COMPANY, Limited:
Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S.

Your Choice of Four Styles

Everlastic Multi-Shingles. Four shingles in one. Tough, elastic, durable. Made of high-grade waterproofing materials and surfaced with crushed slate, red or green. When laid they look exactly like individual shingles and make a roof worthy of the finest buildings. Fire-resisting. Need no painting.

Everlastic Single Shingles. Same material and art-finish (red or green) as the Multi-Shingles, but made in single shingles; size 8x12¾ inches. A finished roof of Everlastic Shingles is far more beautiful than an ordinary shingle roof and costs less per year of service.

Everlastic Slate-Surfaced Roofing. The most beautiful and enduring roll roofing made. Surfaced with crushed slate in art-shades of red or green. Requires no painting. Nails and cement in each roll.

Everlastic "Rubber" Roofing. Thousands upon thousands of buildings all over the country are protected from wind and weather by Everlastic "Rubber" Roofing. It is tough, pliable, elastic, durable and very low in price. It is easy to lay; no skilled labor required. Nails and cement included in each roll.

Legal Department

Decisions

INJURIES TO EMPLOYEES IN DEMOLISHING BUILDINGS.

The Pennsylvania Supreme Court lately had occasion to follow a rule of law which has been frequently applied by the courts of other states—the principle that the general rule of law which requires an employer to provide a reasonably safe place of work for his employees does not apply to the wrecking of a building damaged by fire.

"Everybody knows," says the court, "that a fire weakens a building, and the work to be performed is to remove the insecure parts of the building, that it may thereafter be restored and made safe. In such cases the rule of assumption of risk peculiarly applies, and the requisite of a safe place to work does not." (Searles vs. Boorse, 107 Atlantic Reporter, 838.)

Plaintiff was injured through giving way of a section of floor in a building which had been damaged by fire. He sued for damages and a jury found in his favor. But the Supreme Court affirms a judgment of the trial judge, upsetting the verdict and dismissing the suit, on the ground that the defendant employer was not guilty of negligence and that the accident was such as plaintiff employee was bound to foresee as a natural incident to the demolition of a partly burned building.

DOES A BUILDER IMPLIEDLY GUARANTEE THE LASTING SAFETY OF HIS WORK?

An unsuccessful attempt has been made to hold a building contractor liable for death of a person who was struck by a cornice which fell from its place overhanging a sidewalk some considerable time after the cornice had been erected. The claim was litigated in the case of Howard vs. Redden et al., 107 Atlantic Reporter, 509, decided by the Connecticut Supreme Court of Errors.

It was shown that the cornice fell because of a rotting of the wood and rusting of the tin and nails used in its construction. How long before the accident the cornice had been put up did not appear, but the court inferred that it must have been some considerable time, both because plaintiff failed to state the time and because disintegration of the materials would require comparatively long time.

"A contractor or workman is surely not the insurer of the everlastingness of the materials of a cornice built by him," remarks the court in affirming a judgment in the builder's favor. "The owner, or occupier, as the case may be, is under obligation to give such inspection and make such repairs as will at least preserve the structure from the dangerous effects of natural causes, wind, rain, dampness, which no foresight of construction can guard against."

In reaching its decision the court refers to one of its earlier opinions in which it was even held that a builder was not liable for loss sustained by the lessee of a building which collapsed through structural defects, where the owner knew that the building was unsafe when he rented it to the lessee. The owner's failure to impart his knowledge of the defects to the lessee, and not the builder's negligence, was held to have been the actionable cause of the lessee's loss.

IS THERE ANY COMEBACK ON A CHECK "IN FULL?"

Frequently where dispute exists between an owner and a builder as to the amount remaining due the latter for work done the owner sends a check bearing on its face a statement that the remittance is in "full payment" of the claim. Almost as frequently the builder is dissatisfied because the check is for a smaller amount than he claims to be due. And often the builder will cash the check, in order that he may "nail" that much money, but attempt to ignore the recital on the check of "full payment."

The rights of the parties are quite well settled under the law. If there is no room for dispute as to the amount due, the builder's cashing of the check will not preclude him from claiming the balance actually due. But if there is a bona fide dispute as to the amount actually due, the tender of a check by the debtor for the amount he claims to be due, as full payment, and the cashing of the check by the creditor, establishes what the law designates as an "accord and satisfaction." The creditor then shuts himself off from any right to collect any more money on the particular claim.

And, as said by the Minnesota Supreme Court in the recent case of Beck Electric Construction Co. vs. National Contracting Co., 173 Northwestern Reporter, 413, the creditor cannot avoid this legal effect of his retention and cashing of the check, by striking out the words on the check reciting that the remittance is tendered in full settlement. Quoting from a standard legal authority (Ruling Case Law, 196), the court says:

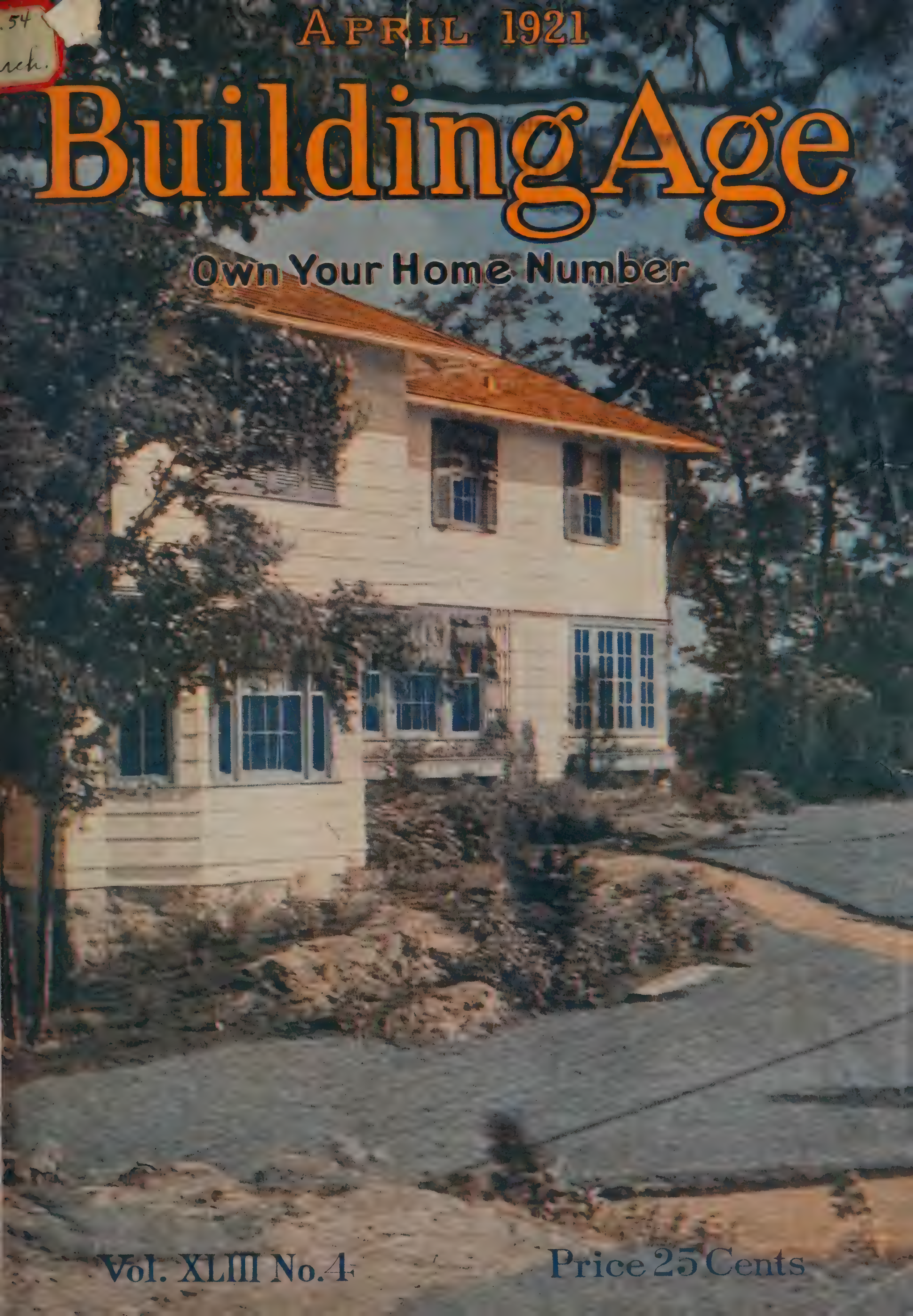
"When a check is sent upon the condition that it be accepted in full payment of a disputed claim, there is, as a general rule, but one of two courses open to the creditor, either to decline the offer and return the check or to accept it with the condition attached. The moment the creditor indorses and collects the check, knowing it was offered only upon condition, he thereby agrees to the condition and is estopped from denying such agreement. It is then that the minds of the parties meet and the contract of accord and satisfaction becomes complete."

.54
rch.

APRIL 1921

Building Age

Own Your Home Number



Vol. XLIII No. 4

Price 25 Cents

CON-SER-TEX
CANVAS ROOFING
FOR ROOFS AND PORCH FLOORS LIKE THESE

The
Ideal Roofing

For Porch Floors
Sun Parlors
Sleeping Balconies
All Flat Surfaces

Wherever a durable flashing or a lining for a wood box gutter is required—

Wherever an economical, durable, attractive covering is needed—

Con-ser-tex Canvas Roofing will give satisfaction. It's a chemically treated heavy cotton fabric which will not crack, stretch, shrink, curl or peel. It's easy to lay and profitable.

Our Free Booklet, "Roofing Facts and Figures" illustrates and explains the many uses and advantages of Con-ser-tex.

WM. L. BARRELL CO.
8 Thomas Street
New York City

Chicago Distributor
Geo. B. Carpenter & Co.
430-440 North Wells St.

California Distributor
Waterhouse-Wilcox Co.
San Francisco and Los Angeles

FLOORS
The Wood-Mosaic Kind

For every home—Old or New. Can be installed by your mechanics. Our 5/16" flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood Carpet, strips Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalogue in natural wood colors.

Wood-Mosaic Company
New Albany, Indiana

Fiberlic
Wall
Board

The *material* from which it is made, the fact that the pulp is *chemically cleansed* and that the *fibre lengths* give the finished product that *natural reinforcement* that is lacking in ground wood boards, is in itself a guarantee of the superiority of Fiberlic for *strong, permanent, economical* and *sanitary construction.*

MacAndrews & Forbes Company
200 Fifth Avenue, New York City
Factory: Camden, N. J.

BUILDING AGE

NEW YORK, APRIL, 1921

The Time to Build Is Now!

THE inactivity compelled by the long period of the war and its subsequent ills is being succeeded by wholesome enterprise. The "future" that we have talked of these many months is, in part, now present. Building has begun!

January, with two exceptions and both due to abnormal conditions, was the best January in ten years. February was 32 per cent. better than January.

Only a few weeks ago New York City passed a tax exemption ordinance applying to dwellings and in one single week the Metropolitan Life Insurance Company loaned $2,000,000 for "walk-up" apartments.

Slightly earlier, the Corn Exchange National Bank of Chicago started a campaign for "Own Your Home" accounts. It produced more than 3,000 inquiries and 300 accounts the first day.

In Philadelphia, the City Council has made 15 million dollars at once available for municipal structures and has announced that 100 million dollars' worth of loans, authorized but unissued, could be had if needed.

Realty sales numbering 764 were made in San Francisco in January, totaling nearly 6 million dollars.

As this goes to press, we learn that federal aid is under serious consideration and there is likelihood that national tax exemption provisions in matters of home construction, and general easing of credits looking toward the erection of dwelling, may yet be a reality.

Does this seem like a time to wait?

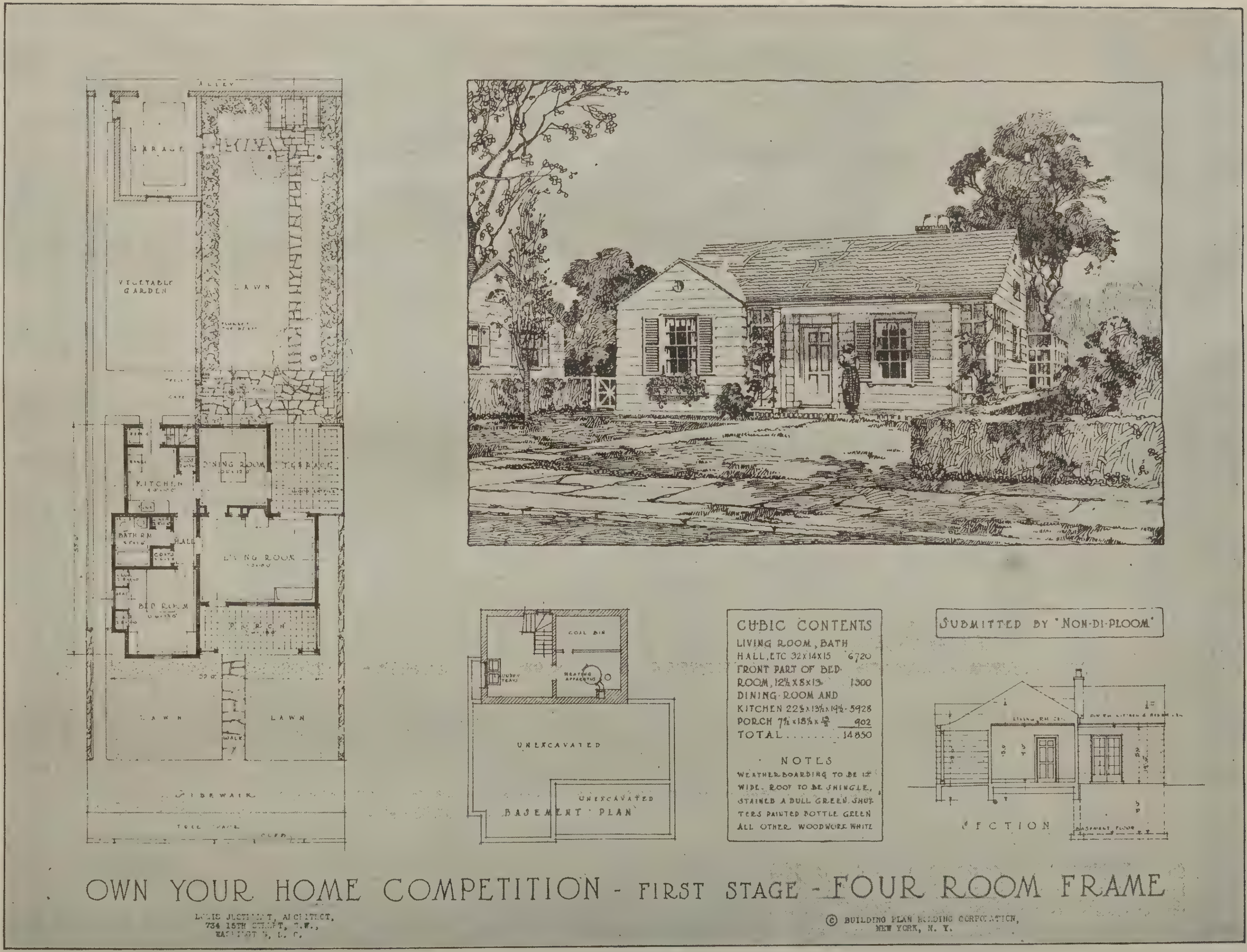
THE need for places to live dominates our building requirements and it is with this in mind that the present issue takes the form of an Own Your Home Number.

BUILDING AGE has in past issues referred generously to the bearing of home owning upon a strengthened position in the community, upon the solidity and influence so acquired. Something by way of reiteration is included herein; attention is directed also to the ways and means of home owning; house planning and efficient construction; prize-winning plans in the recent National Small House Competition, alive with suggestions for every progressive builder, are presented, together with other features that commend themselves equally for earnest thought.

* * *

THE way to get business is to go after it. The jobs will fall to the man who is keen enough to go and get them. He will also get the material and labor to carry them forward. The man who waits will be left behind. Material is not inexhaustible. As new construction increases and the demand for material grows, prices will possibly go up as the available supply is diminished. Prices in the main are as low now as they are likely to be this year.

If you haven't gotten well started yet, get on the job. Build for the sake of yourself, your client, your community, because this is the time to build and the need for homes and other structures is urgent.



SUBMITTED BY "NON-DI-PLOOM"

CUBIC CONTENTS

LIVING ROOM, BATH HALL, ETC 32X14X15	6720
FRONT PART OF BED-ROOM, 12½X8X13	1300
DINING-ROOM AND KITCHEN 22½x13½x19½	5928
PORCH 7½x18½x 13/2	902
TOTAL........	14850

NOTES

WEATHER-BOARDING TO BE 12" WIDE. ROOF TO BE SHINGLE, STAINED A DULL GREEN. SHUTTERS PAINTED BOTTLE GREEN ALL OTHER WOODWORK WHITE

OWN YOUR HOME COMPETITION - FIRST STAGE - FOUR ROOM FRAME

LOUIS JUSTEMENT, ARCHITECT,
734 15TH STREET, N.W.,
WASHINGTON, D. C.

© BUILDING PLAN HOLDING CORPORATION,
NEW YORK, N. Y.

Copyright, 1921, Own a Home Exposition, Inc.

FIRST PRIZE—FRAME HOUSE
Louis Justement, Architect, Washington, D. C.

Own Your Home

What Does Home Owning Mean? What Does It Offer? Why Do People Want to Own Their Homes?

By WM. E. HARMON, *President, Wm. E. Harmon & Company, Inc.*

THE increasing desire for home ownership affords a business opportunity for the builder today and relieves him to a large extent from carrying the entire financial burden of home building without assistance.

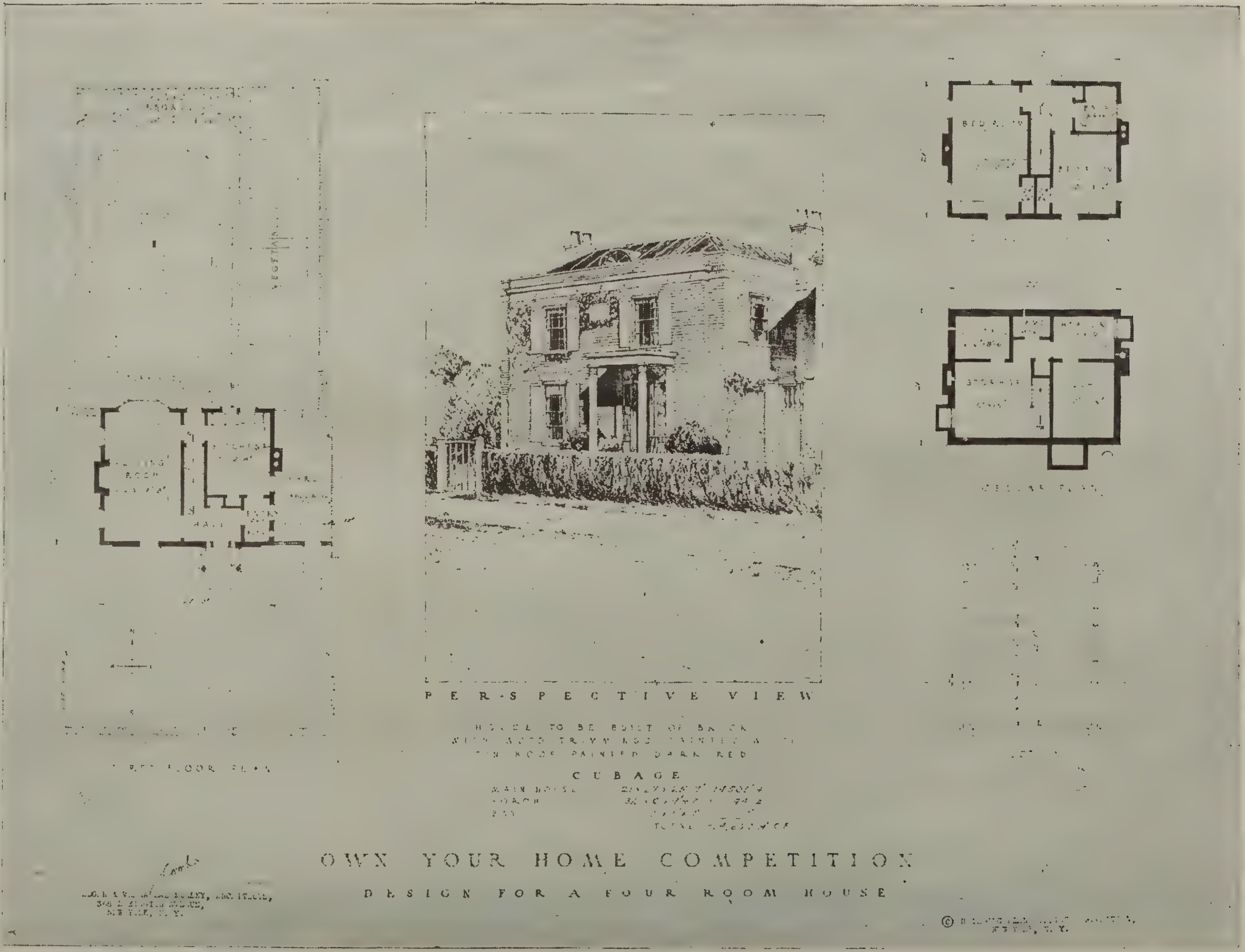
Every house should belong to the family that lives in it. The desire for possession is a deep-rooted human instinct. There is a personal interest in the house that has been planned, built and owned by the tenant. Call it pride, or what you will, it is there, and it makes for better built houses, better kept houses, better workers, better citizens and more contented families. Let us recognize clearly, therefore, the economic, political and moral values of assuring to everyone something of his own in home building and home owning. It gives each family a sense of having a stake in the community, a continuous interest in and responsibility for the well-being of the City, State and Nation.

Banks have long ago recognized home owners as better financial "risks" than their neighbors who rent. They make better depositors. Merchants recognize that they are better people to deal with. They pay their bills promptly. Employers know they are more reliable in their work. They give dollar for dollar; they are steady.

So much for the character of the people who own their homes. But why do they *want* to own their homes? What incentive is there? What does a home offer besides a pride of ownership? With one exception practically everything bought by money disappears in a short time. The necessities of life last only a few days or months at the most. The life of industrial and factory equipment is short. Luxuries are soon discarded. But homes represent one form of expenditure which gives the fullest satisfaction without wearing out and becoming worthless. The present permanence of building construction insures practically unlimited life. Home building and owning is, therefore, a sound business proposition.

Every dollar put into the building of homes means an increase in the national wealth of the country that will not depreciate and become worthless in a few years. Home building should, therefore, have the moral and active support of every farseeing interest in the country. It already has that support among the bankers, the life insurance companies and the industrial companies. But Government, banking and business should not rest until they have unearthed every means to encourage more home building than ever before, because such investments mean a safer, saner, happier and wealthier country as a whole.

A Harmon Development in the Flatbush Section of Brooklyn, N. Y.



Copyright, 1921, Own a Home Exposition, Inc.

FIRST PRIZE—BRICK HOUSE
Edgar & Verna Cook Salomonsky, Architects, New York City

]

Small Houses at Moderate Cost

Prize-Winning Designs in the Recent Small House Competition Indicate That Homes May Be Built Today at Moderate Cost

AFFILIATED interests in the Own Your Home movement have assembled, through the recent national Small House Competition on which awards were made in Chicago in February, a remarkably diversified series of plans for small homes. Of 4, 5 and 6 rooms each, they utilize three classes of material, frame, brick and back plastered metal lath and stucco. The popularity of this campaign promises to give immense impetus to the whole building idea in the sections of the country to which the plans will be made accessible during the next three months.

The competition, held with the approval of the American Institute of Architects, and judged by a strong jury of architects, composed of nationally known men, culminated in the selection of 50 specially meritorious designs. Immediately after preliminary inspection, the jury and building materials interests that had backed the competition decided to arrange at once to make a special exhibit of at least 50 original drawings including prize winners and special merit awards at the Chicago "Own Your Home" Exposition, March 26 to April 6, and the New York show in the 22d Regiment Armory, April 16-30. The decision followed also to print 50 selected designs in a handsome permanently bound plan book which will be available for general distribution by April 1.

New York builders and building material men felt sure after a first inspection of the drawings that the "public view" of these plans at the New York "Own Your Home" show would be one of the greatest drawing cards of that event. The winning architects are preparing detail working plans and specifications on their successful designs and as fast as these are received and checked as to accuracy, the affiliated interests are prepared to sell them to the general public at a maximum cost of $25 for the complete set of working drawings and specifications.

The total number of designs submitted in the competition exceeded 1,800. From these the selections were made on the following schedule of prize awards, honorary mentions and classified merit designs:

Four graded prizes and 4 honorary mentions each in the 3 general classes, frame, brick and back plastered metal lath and stucco, 4, 5 and 6 rooms (the larger number of these awards are for 4-room designs).

Three "group awards," without regard to material for the best series of 4, 5 and 6 room designs.

Seven special merit designs for each class, lumber, brick back plastered metal lath and stucco.

The diversity of types represented in this series of 50 drawings is its outstanding feature. Architects from Boston to Los Angeles are in the list of awards. The Colonial house of the simplest old time character and the modified eastern bungalow, vie with the more stately country home, economically built, and the Spanish mission type of the Pacific Coast.

The awards were based primarily on economy in building and convenience of floor plan. The requirements to be met by the architect were stated in the following language in the rules for the competition:

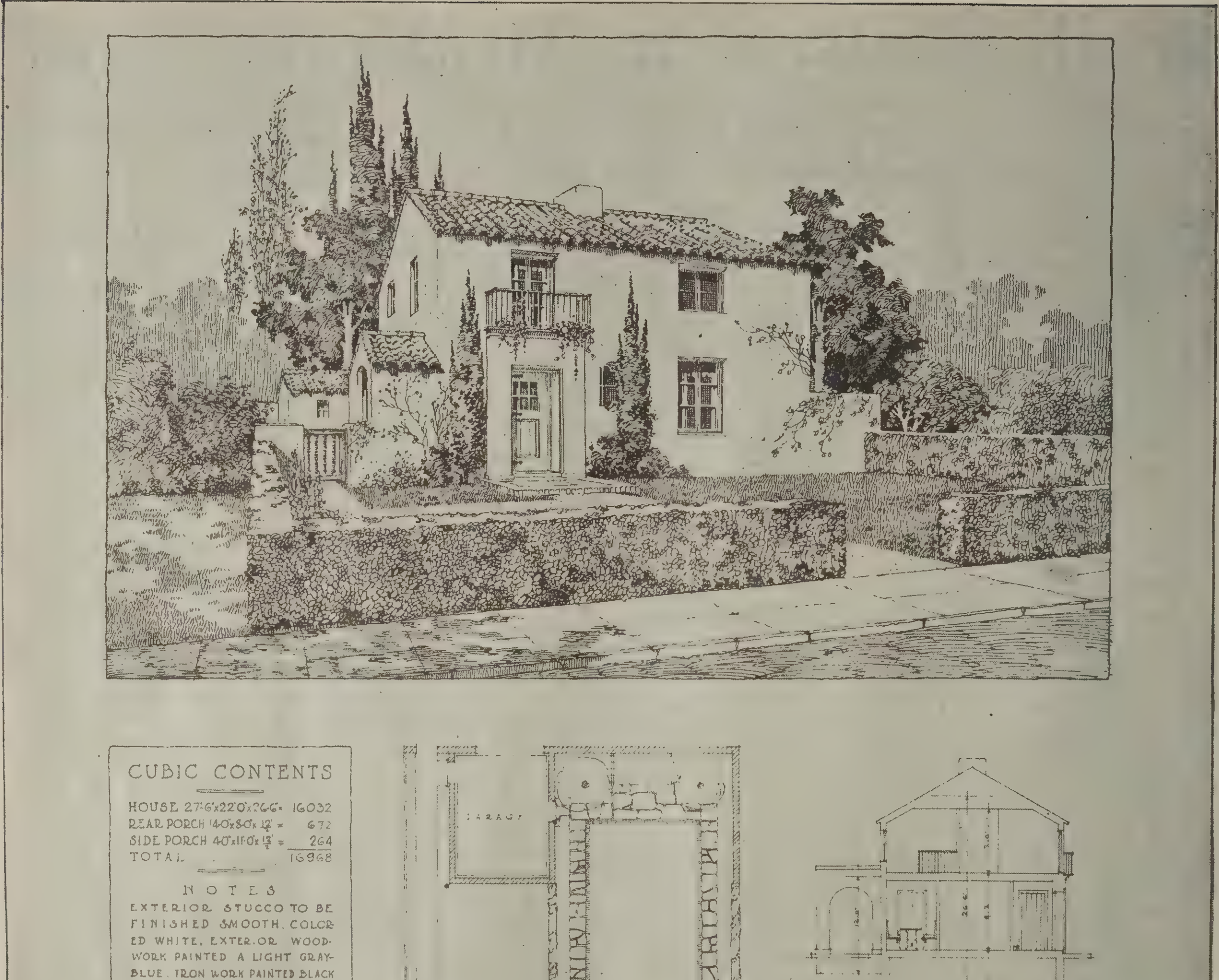
> Assume a home for an American family of good taste, small means, and no servants, desiring to make a charming home with (a) beauty of design obtained by harmony of line, color, and proportion, and simplicity and treatment of the house and grounds, (b) the maximum of housekeeping facility and convenience for all phases of indoor and outdoor family home life, and (d) the minimum exterior and interior upkeep and operating expense, and (e) the minimum of cost consistent with a, b, c and d.

Estimated costs on these designs range from $5,000 to $12,000, the estimates being based on costs of materials and labor in the New York district, March 1. Cost estimates on the first, second, third and fourth prize winners in the frame, brick and brick and back plastered metal lath and stucco classes indicate the range of design.

Frame Houses, First prize, $5,240; second prize, $8,000.
Brick houses, First prize, $5,900; second prize, $6,400.
Stucco houses, First prize, $6,900, second prize $8,300.

EXHIBITIONS of these plans are scheduled for other cities after the close of the New York show. Builders are exhibiting models of the prize designs at the shows both in New York and Chicago.

The "Home Builders' Plan Book," as the new publication is to be called, with these 50 designs showing perspective, floor plan, measurements, estimated cost and landscaping suggestions will be a handsome volume. Accompanying every plan is a landscape suggestion for the setting for the home. The rights on the publication are held by the Building Plan Holding Corporation of New York City, a corporation specially formed to issue the publication and circulate the working drawings. The exclusive distributors of the book and drawings are Moore, McCord, Gilchriese and Associates, Inc., 24 West 39th Street, New York City.


CUBIC CONTENTS
HOUSE 27'-6"x22'0"x26'-6" = 16032
REAR PORCH 14'0"x8'0"x 12'/2 = 672
SIDE PORCH 4'0"x11'0"x 12'/2 = 264
TOTAL 16968
NOTES
EXTERIOR STUCCO TO BE FINISHED SMOOTH. COLORED WHITE. EXTERIOR WOODWORK PAINTED A LIGHT GRAY-BLUE. IRON WORK PAINTED BLACK ROOF TO BE OF RED MISSION TILE. MECHANICAL UNIFORMITY TO BE AVOIDED IN WALL AND ROOF.
GARAGE
VEGETABLE GARDEN
WALK
PORCH
UNEXCAVATED
BOILER RM
DIN ALCOVE
KITCHEN
HALL
LIVING ROOM
DECK
HALL
BATH
BED ROOM
BED ROOM
SUBMITTED BY
"AT THE DISCRETION OF THE JURY"
OWN YOUR OWN HOME COMPETITION
FIRST STAGE
FOUR ROOM STUCCO
734 15TH ST., N.W.,
NEW YORK, N. Y.

Copyright, 1921, Own a Home Exposition, Inc.

FIRST PRIZE—STUCCO HOUSE
Louis Justement, Architect, Washington, D. C.

How Tax Exemption Helps Home Builders in New York

Builders Can Exert Their Influence to Have Similar Legislation Passed in Their Own Towns

By EDWARD A. MACDOUGALL, *President, The Queensboro Corporation*

THE tax exemption ordinance will prove a great boon to New York. In the first place it will encourage immediate construction of one and two-family houses and moderately priced apartments, particularly in the Borough of Queens, for the reason that: *First*: The exemption applies only to the assessed value of the improvement and is limited to $1,000 per room—not to exceed $5,000 per family. *Second*: The land upon which moderate priced buildings can be erected in the Borough of Queens would only represent a small percentage of the total cost, whereas in Manhattan the land value would represent probably one-half or more of the total cost.

It must be apparent, therefore, that the greatest benefit will accrue to the moderately priced buildings on moderately priced land. This will serve the exact purpose for which the tax exemption was intended—to encourage the building of moderate priced homes, as the great shortage of living accommodations in the City of New York today is the lack of accommodations for people who can afford to pay from $25 to $150 per month.

The exemption would mean the saving to a family buying a one-family house or an apartment, where the exemption equalled the full assessed value of the premises, of $10 per month on a five-room apartment, or in ten years a total saving on taxes of $1,425, which, if capitalized at 6 per cent., would equal about 38 per cent. of the assessed valuation of the improvement. This would be a very substantial saving to the family desirous of securing a home, and should result in a very active market this year for co-operative apartments and moderate-priced homes.

It has been maintained that the cost of construction will be reduced so that the incentive of tax exemption would not be required. The peak of construction cost was reached during the past year, when building operations were suspended.

There has been a reduction in price from the peak both in the price of building material and in the cost of labor, particularly common labor, but the average price of construction is now about the 1919 cost, and we believe, will remain so unless there is some very substantial reduction in the cost of skilled labor in the building trades.

As building gains momentum there will be need for more labor than there is available, and under those circumstances it would not seem reasonable to assume that skilled labor in the building trades would be willing to accept a very great reduction in its rate, probably not less than the wages that prevailed in 1919.

The City of New York in encouraging home-ownership by tax exemption encourages new building. This will naturally increase its income and the increment to land, as a result of an active building market.

Further, the savings institutions should make mortgage loans on a reasonable value so that builders can be encouraged to do everything within their power to provide housing, that certain of our city and state officials will not be justified in their continual demand for Federal, State or municipal housing.

It is certainly necessary to provide new housing at once so that there can be no requirement for the reenactment of the restrictive rent laws, and if the public can be induced to buy their homes or apartments instead of paying abnormal rentals due to the scarcity of living accommodations—the Tax Exemption law is more than justified.

Tax Exemption Ordinance, New York City

It is hereby determined that until January 1, 1932, new buildings in the City of New York planned for dwelling purposes exclusively, except hotels, shall be exempt from taxation, as herein provided, for local purposes other than assessments for local improvements during construction and so long as used or intended to be used exclusively for dwelling purposes, or if a building of four stories or more in height used exclusively for dwelling purposes above the ground floor, provided construction was completed since April 1, 1920, or if not so completed that construction be commenced before April 1, 1922, and completion for occupancy be effected within two years after such commencement, or if on September 27, 1920, in course of construction within two years after such act took effect.

(*Continued on page* 48)

Building Loan System Developed by the Metropolitan Life Ins. Co.

By WALTER STABLER, *Comptroller, Metropolitan Life Insurance Company*

FROM the top of the Metropolitan Tower in New York the observer can see the country spread about him for a distance of fifty miles on land and sea. This remarkable vision is indicative of the farseeing policy of The Metropolitan and other insurance companies who are making their funds available to the working people throughout the country for the purpose of building homes.

The Metropolitan Life Insurance Company believes that its duty lies in giving financial assistance to the building of moderately-priced small houses because the people who live in such houses are the hardest hit by the housing shortage. That the building of dwelling places today is a sound business proposition is evidenced by the fact that this Company has gone into it on a large scale.

In this article, Mr. Stabler, directing head of the Loan Department, explains the plan followed in these financing operations. In a personal interview Mr. Stabler stated that he believed the quickest and surest way to relieve the present housing shortage lay in the course that is being followed by the Company, namely, placing its funds on a large scale within the reach of prospective home owners among the working people, and of builders and industrial concerns who are building homes for these people. Mr. Stabler stated emphatically that the increasing number of applications for loans indicated an already increasing activity in home building.

The method described here is in wide use among builders. The Goodyear Tire & Rubber Company, who recently built 900 houses for its employes in Akron, Ohio, and the Queensboro Corporation, whose Garden Apartments are at Jackson Heights, New York City, made use of Metropolitan loans.

Builders throughout the country have taken advantage of the Metropolitan Plan for Financing Home Building. In New York City, the Queensboro Corporation has made use of it in financing their Garden Apartments at Jackson Heights. In Akron, Ohio, the Goodyear Tire & Rubber Company has built 900 houses for its employees with the aid of these loans. Altogether the Company has made more than 5,000 loans for home building and the demands for loans are coming faster and faster. It is no longer true that money for home building is not available. It is available and as much as is needed.

THE methods used by the Metropolitan Life Insurance Company for placing loans on small dwellings and apartment houses are as follows: The company appoints a local bank, trust company or mortgage guarantee company its representative for the making of loans on new small dwellings and on new moderately-priced apartment houses. The loans on new dwellings must not exceed $5,000 nor be less than $2,000. The loans on apartment houses depend upon their size and value. It does not entertain loans on houses that have been finished and occupied for some time, as loans of this kind do not add to the housing accommodations of the nation. No loans are made at more than 50 per cent. of the land value and the construction cost of the buildings, omitting carrying charges, overhead or profit. They are made for fifteen years at current interest rates. Interest is paid semi-annually, on the first days of June and December. On every interest date a 3 per cent. instalment is paid on account of the principal, all payments being made in New York funds, at par. The banking representative is to collect interest and instalments, look after payment of insurance and taxes and remit twice each year to this company the amount collected. For this service the bank, in some cases, receives one-half of one per cent. of the interest, and in other cases a commission is charged the borrower in the beginning to pay for the services of the bank. The representative must either guarantee absolutely the payment of principal and interest to the company, or it must agree to repurchase any of the loans that become in default.

Building and Selling Homes on Co-operative Plan

Plan of the Queensboro Corporation Has Been Unusually Successful. Apartments Are Not Mere Tenement Houses But are Homes Designed for Promoting Health and Happiness Among the Residents

CO-OPERATIVE ownership as applied to the purchase of moderate priced apartments in the City of New York is the outcome of a demand for home ownership.

The Jackson Heights plan of tenant-ownership may be briefly stated as the ownership of an apartment building by the tenants or by a group of people who at the time that they purchase the building become tenants. It is designed to meet the needs of people who, while wishing to enjoy the comforts of living in apartment houses, want to protect themselves permanently against excessive increases in rent.

In order to make an apartment ownership plan successful, it is necessary, among other things, where people of moderate means are concerned, to make possible the surrender of the apartment should business or other causes require a person to move away and also in the case of such removal to protect the other tenant-owners against a loss in value of the investment because of deterioration in the tenancy. To meet these conditions the lease of the apartment and the ownership of the building have been kept separate except that in the first instance the tenant and the owner are the same persons. Literally, each tenant is his own landlord.

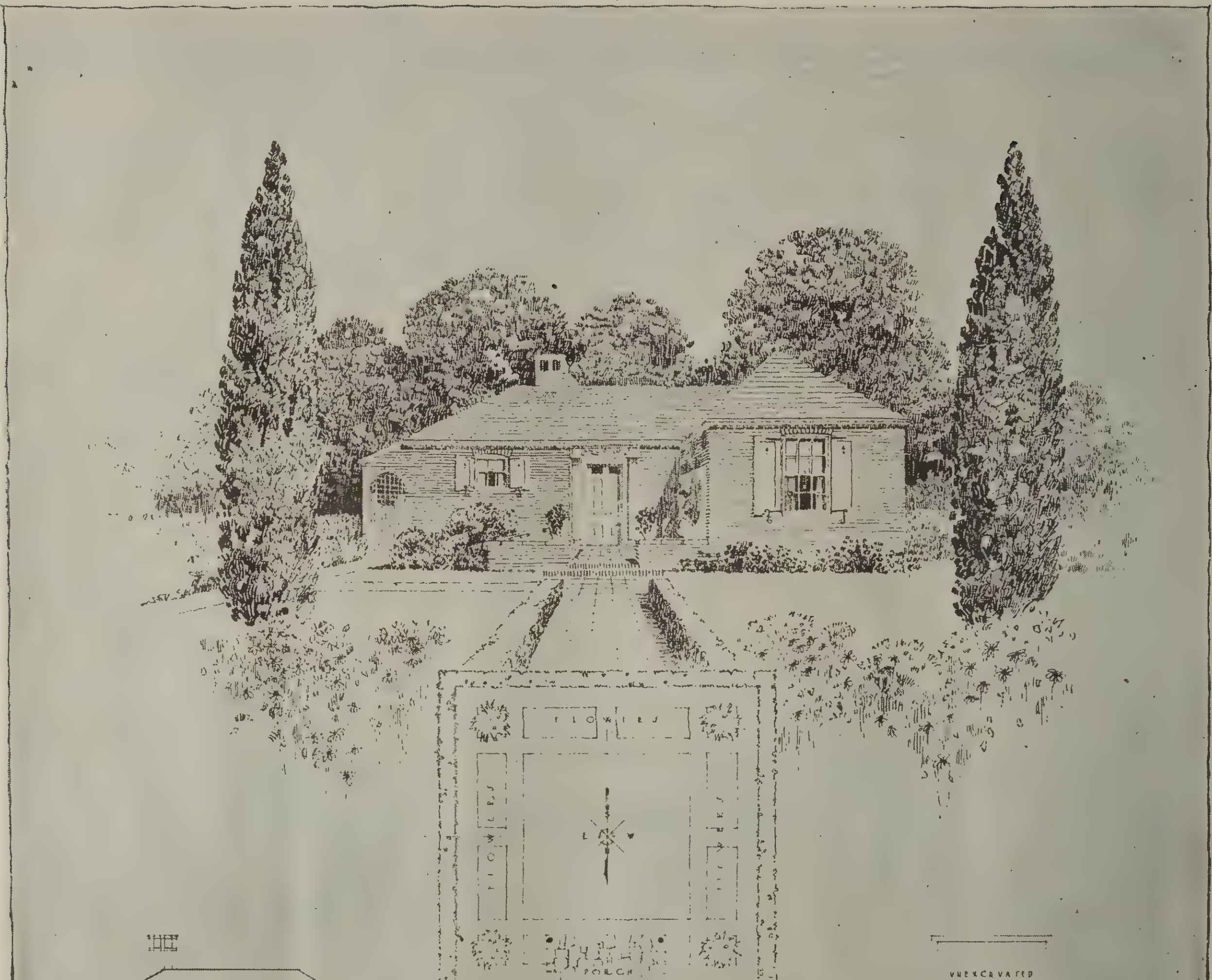
This brings us to the all important question of the character of the tenants. The success of the Jackson Heights plan of tenant-ownership depends upon the careful selection of the tenant-owners. The Queensboro Corporation has for a number of years exercised the utmost care in the investigation of the references, both social and financial, of its prospective tenants, and one of the principal reasons that it has adopted Jackson Heights plan of tenant-ownership for the sale of its buildings is to perpetuate this high standard of tenancy. The successful sale of a number of buildings to tenant-owners has demonstrated beyond question the successful accomplishment of this purpose.

View at the Rear of the Garden Apartments

"Garden Apartments" is not an empty name but a reality

The value of an apartment building is divided into two parts. The first mortgage usually held by a savings bank or life insurance company and the equity which represents the owner's interest. This equity is capitalized by the formation of a corporation to take title to the building. The tenant-owners each subscribe for an amount of stock which is proportioned to the size of the apartments which they occupy. In other words, the tenant-owner of a four-room apartment would not be required to purchase as much stock as the tenant-owner of a five-room apartment, and so on. After the stock is purchased, each tenant-owner becomes a director in the corporation owning the building.

At the time he purchases the stock, the tenant-owner leases an apartment at the current rent. This lease is renewable indefinitely at his option. He may give notice in any year that he wishes to sur-



Copyright, 1921, Own a Home Exposition, Inc.

SECOND PRIZE—BRICK HOUSE
John Barnard, Architect, Boston, Mass.

render his lease the following October 1st, whereupon after October 1st his liability for the rent ceases and the apartment is leased to someone else.

The By-Laws of the Corporation are framed so that at all times the market rent of the building shall be the rent charged. The purpose of this provision is to protect the interests of the tenant-owner who ceases to be a tenant but remains interested in the building as an investor. Of course as regards the original tenant-owners, so long as they occupy their apartments they are protected by their leases from any further increase in rent.

Tennis Courts Are Only One Form of Recreation Provided for Residents

There is, of course, no restriction upon the sale of his stock by a tenant-owner, but such a sale of stock would not carry the right to the buyer to occupy an apartment. Unless the buyer conformed to the standard of tenancy set by the corporation, he could not lease an apartment.

Playgrounds for the Kiddies at Jackson Heights

The corporation of tenant-owners make a contract for the management of the building for a period of years with the Queensboro Corporation, which manages the operation of a great many buildings, and by its large scale purchases of supplies, coal, etc., is enabled to handle the management with far greater economy than would otherwise be possible.

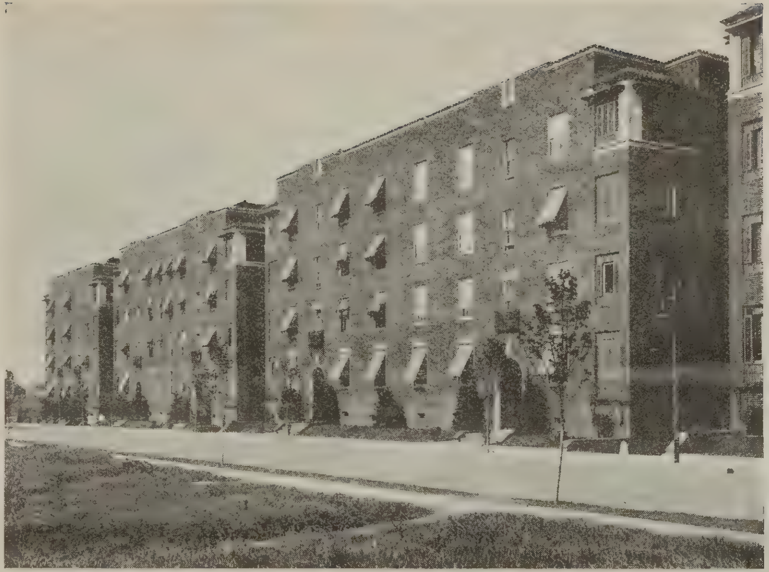
The Queensboro Corporation, as agent for the tenant-owners, collects the rent, makes all the disbursements on account of the operation of the building, and turns over the balance of the rents collected to the stockholders as a dividend upon their investment. Apart from the duty of the tenant-owners as directors of the corporation meeting twice a year to declare a dividend, they are relieved from all burden and care in connection with the management of the building. It should here be noted, that viewed from the ordinary point of view of the home-owner, the tenant-owner is living in his apartment at the actual cost of running the building and that all rent paid in excess of this actual cost comes back to him.

Among the actual costs of running the building are included such items as taxes and interests upon the mortgage, janitor service, heat, light of public halls, maintenance and repairs, and, most important to the prudent investor, an annual payment on account of the principal of the mortgage, which is thus gradually reduced and paid off over a period of years.

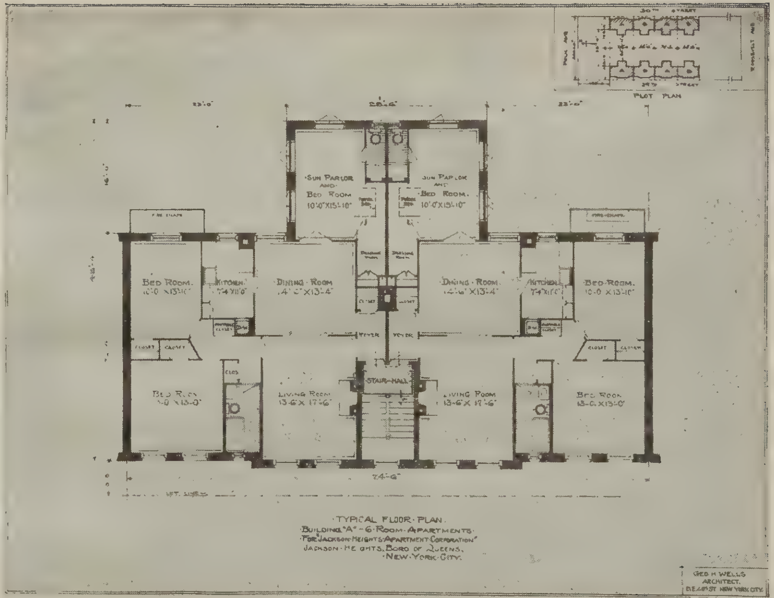
The question is often asked: "Why not sell a man an apartment outright instead of a stock interest in the building? There are two important reasons.

A person of moderate means cannot afford to pay rent in two places at the same time. If he owns the apartment, and because of business or other reasons has to move away, and cannot rent his apartment, he must pay the rent until he can sublet it. Under the Jackson Heights plan of tenant-ownership he can surrender his lease at the end of any year, and thus be free from a responsibility frequently quite burdensome.

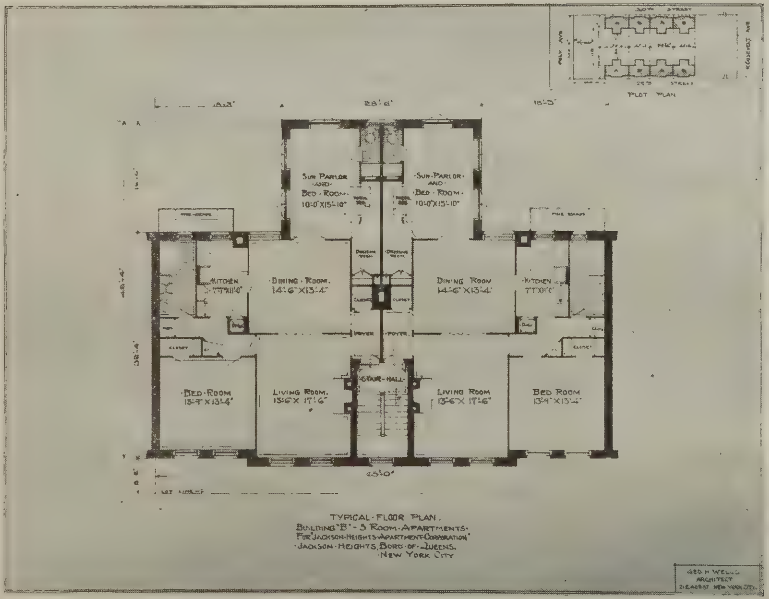
If a sale of stock carried the right to the occupancy of the apartment a deterioration in the tenancy might take place with resultant loss and injury to the other tenant-owners. Under the Jackson Heights plan of tenant-ownership this cannot occur. Except in the first instance the ownership and tenancy are separate, and an undesirable person purchasing stock could not gain occupancy of an apartment. The new purchaser of stock could only become a



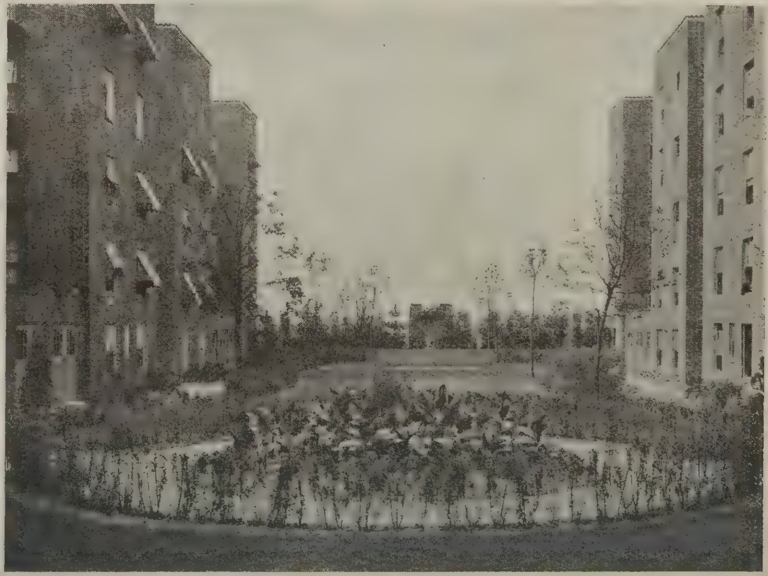
View of the Apartments from the Street


PLOT PLAN
28'-6"
23'-0"
SUN PARLOR AND BED ROOM 10'-0"X15'-10"
SUN PARLOR AND BED ROOM 10'-0"X15'-10"
FIRE ESCAPE
DRESSING ROOM
BED ROOM 10'-0 X13'-10"
KITCHEN 7'-4"X11'-0"
DINING ROOM 14'-6"X13'-4"
DINING ROOM 14'-6"X13'-4"
KITCHEN 7'-4"X11'-0"
BED ROOM 10'-0 X13'-10"
CLOSET
FOYER
STAIR-HALL
BED ROOM 13'-0 X13'-0"
LIVING ROOM 13'-6"X 17'-6"
LIVING ROOM 13'-6"X 17'-6"
BED ROOM 13'-0 X13'-0"
74'-6"
LOT LINE
TYPICAL FLOOR PLAN.
BUILDING "A" - 6 ROOM APARTMENTS
FOR "JACKSON HEIGHTS APARTMENT CORPORATION"
JACKSON HEIGHTS, BORO OF QUEENS,
NEW YORK CITY.
GEO H WELLS
ARCHITECT

Typical Floor Plan of a Six-Room Apartment


PLOT PLAN
28'-6"
18'-5"
SUN PARLOR AND BED ROOM 10'-0"X15'-10"
SUN PARLOR AND BED ROOM 10'-0"X15'-10"
DRESSING ROOM
KITCHEN 7'-7"X11'-0"
DINING ROOM 14'-6"X13'-4"
DINING ROOM 14'-6"X13'-4"
KITCHEN 7'-7"X11'-0"
CLOSET
FOYER
STAIR-HALL
BED ROOM 13'-9"X13'-4"
LIVING ROOM 13'-6"X 17'-6"
LIVING ROOM 13'-6"X 17'-6"
BED ROOM 13'-9"X13'-4"
65'-0"
LOT LINE
TYPICAL FLOOR PLAN.
BUILDING "B" - 5 ROOM APARTMENTS
FOR "JACKSON HEIGHTS APARTMENT CORPORATION"
JACKSON HEIGHTS, BORO OF QUEENS,
NEW YORK CITY
GEO H WELLS
ARCHITECT

Typical Floor Plan of a Five-Room Apartment



Gardens in the Rear of the Jackson Heights Apartments

THE JACKSON HEIGHTS CO-OPERATIVE APARTMENTS tenant if he conformed to the standard of tenancy of the building.

To sum up briefly, the Jackson Heights Plan of Tenant-Ownership of apartment buildings is effected by the division of the equity above the mortgage into shares which are sold to people whose references as to social and financial standing are carefully investigated. These people lease apartments under a yearly lease renewable indefinitely at their option. Each purchase of stock by a tenant-owner is proportioned to the size of the apartment that he leases.

The Corporation of tenant-owners employs an agent to manage the building. A tenant-owner may give up his lease at the end of any year. He may sell his stock to whom he chooses. His sale of stock does not carry with it a right to occupy his apartment. The new tenant, whether a purchaser of stock from a former tenant or not, must be of a character to conform to the standard of tenancy of the building.

Over 350 families have purchased an interest in the apartments in which they live and now find themselves in the position of home owners while yet enjoying the comforts and relative ease of living in an apartment.

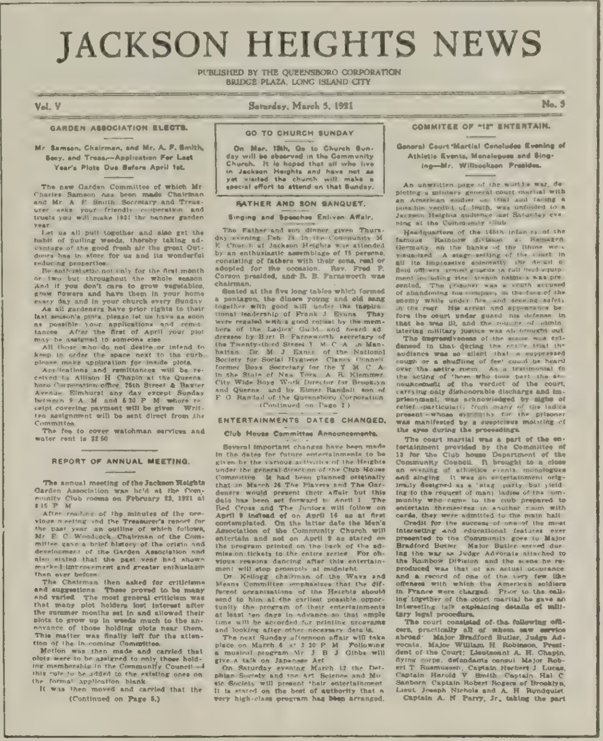
UNIQUE OPPORTUNITY FOR SAVING

The point to be emphasized here is the unique opportunity for saving, which has been made a part of the Jackson Heights plan and which enables anyone who has saved $2,000 to participate in the ownership of an apartment and to pay for the balance of their share in the building out of the savings which they effect by participating in the plan. Here the man enjoys his home while he pays for it. Let us take a concrete example:

A five-room apartment in one of the new Garden Apartment buildings. This is not a five-room apartment in an ordinary tenement, but one in which sunlight streams in every window, one whose front rooms look out upon the street and whose rear rooms look out upon a great interior garden.

The share in the equity for this five-room apartment is $6,500. The monthly payment on the lease amounts to $99 (this apartment elsewhere would cost from $125 to $150). The thoughtful man will at once see that this is a test of the soundness of the plan. Of this $99 about $61 per month is expended for coal, water, janitor service, taxes, interest, repairs, amortization on the mortgage, management and fixed charges. The balance estimated at $38 a month comes back to the tenant-owner at the end of each six months in the form of dividend upon his investment and represents a net income of about 7 per cent.

Take the man who has saved $2,000 and who wishes to pay for his apartment with his future savings. By paying $2,000 upon his share in the equity, he is left owing $4,500. In addition to the rent of $99 he pays $35 a month on this deferred balance so that his total payment amounts to $134. This payment, together with the dividends upon his share in the building, will pay the balance due on his stock with 6 per cent. interest in about six years and four months.



JACKSON HEIGHTS NEWS

PUBLISHED BY THE QUEENSBORO CORPORATION
BRIDGE PLAZA, LONG ISLAND CITY

Vol. V — Saturday, March 5, 1921 — No. 5

GARDEN ASSOCIATION ELECTS.

Mr Samson, Chairman, and Mr. A. F. Smith, Secy. and Treas.—Application For Last Year's Plots Due Before April 1st.

REPORT OF ANNUAL MEETING.

GO TO CHURCH SUNDAY

On Mar. 13th, Go to Church Sunday will be observed in the Community Church. It is hoped that all who live in Jackson Heights and have not as yet visited the church will make a special effort to attend on that Sunday.

FATHER AND SON BANQUET.

Singing and Speeches Enliven Affair.

ENTERTAINMENTS DATES CHANGED.

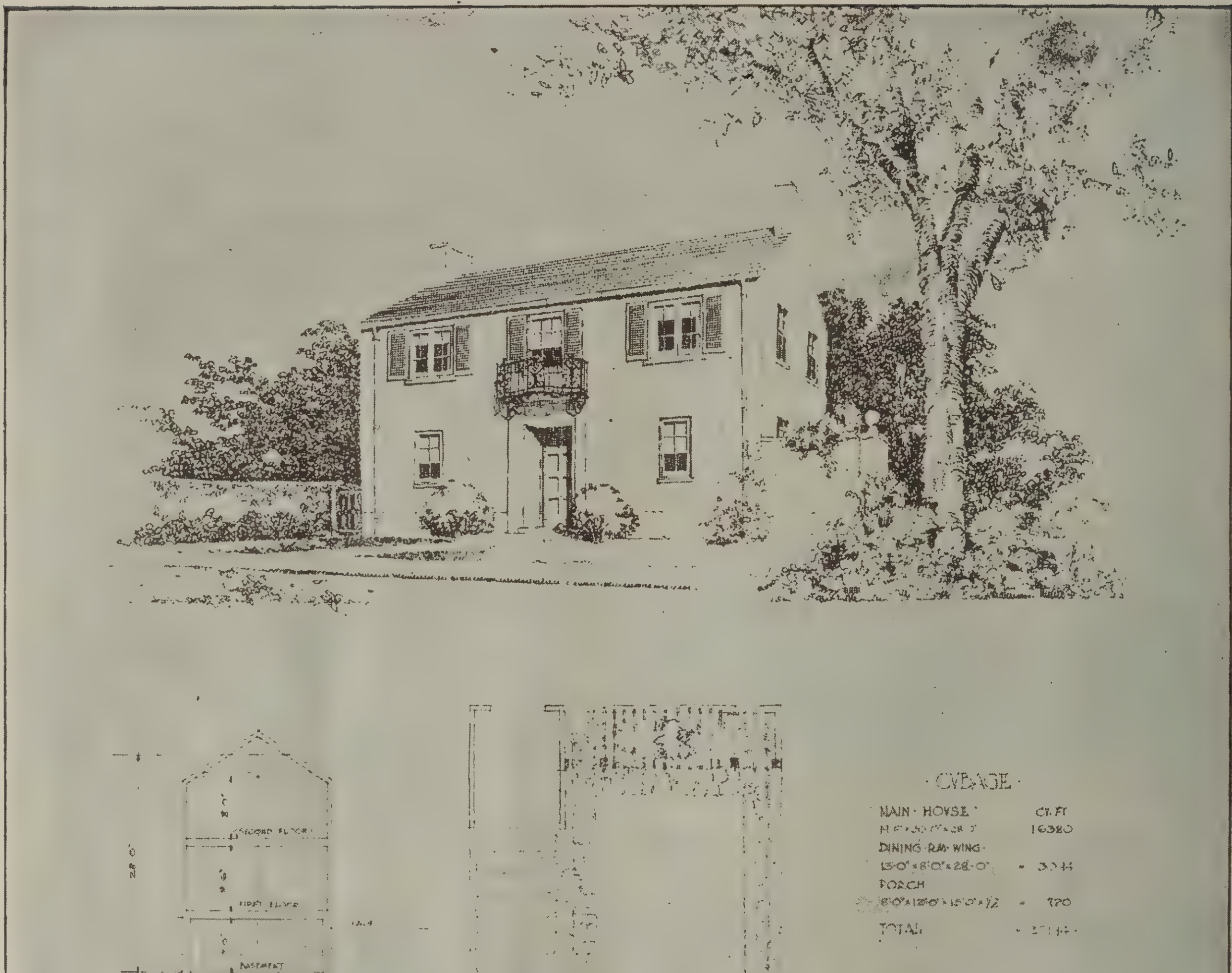
Club House Committee Announcements.

COMMITEE OF "12" ENTERTAIN.

General Court Martial Concludes Evening of Athletic Events, Monologues and Singing—Mr. Willcockson Presides.

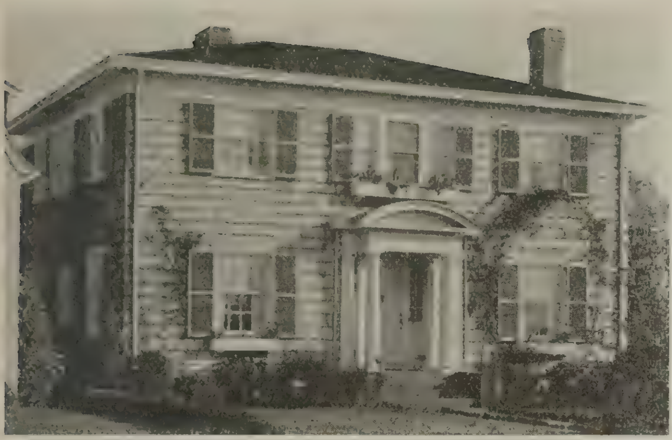
Community Spirit Is Fostered by a Six-Page News Sheet

These apartments are laid out with the health, comfort and happiness of the tenants constantly in mind. Sunlight comes in through every window. The usual narrow cement court in the rear is a flower garden and grass plot 85 ft. wide and the whole block long. There are playgrounds for the children, tennis courts for everybody, fruit and vegetable gardens for those who want them. There is a golf course and a community clubhouse with bowling, dancing, billiards, swimming pool and gymnasium. There is a social center which makes the newcomer feel at home and introduces him to his neighbor. Residents are eligible to all these advantages.

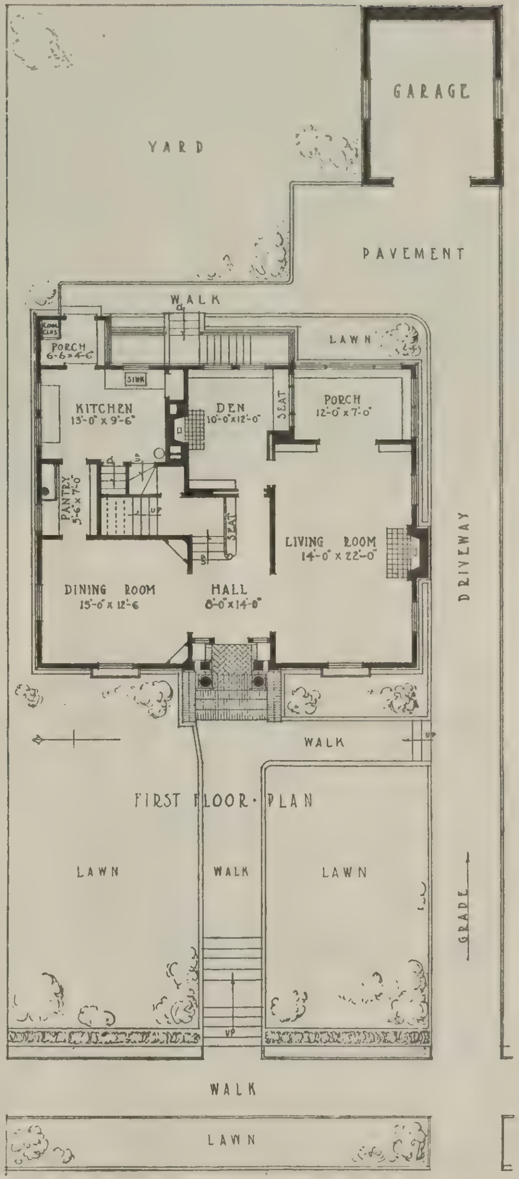


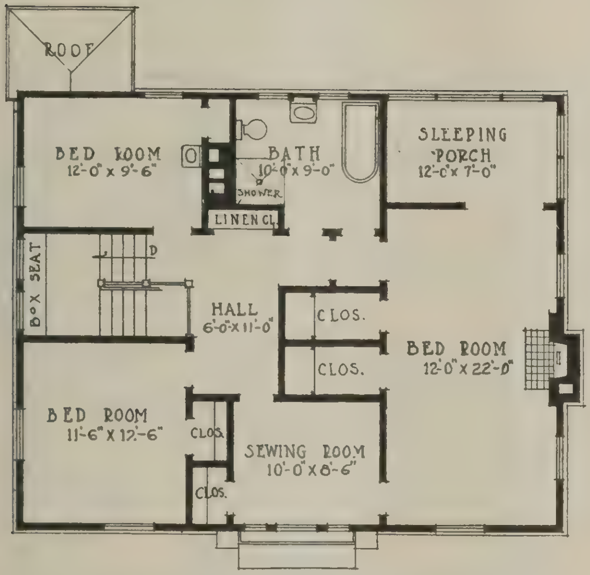
Copyright, 1921, Own a Home Exposition, Inc.

SECOND PRIZE—STUCCO HOUSE
Amedo Leone, Architect, Detroit, Mich.



Front View





Second Floor Plan

Ground Plan

The exterior of this house at Seattle, Wash., is simplicity itself. Expensive "gingerbread" has been omitted and at the same time artistic dignity has been achieved. The ground floor arrangement is particularly convenient from the housewife's standpoint.

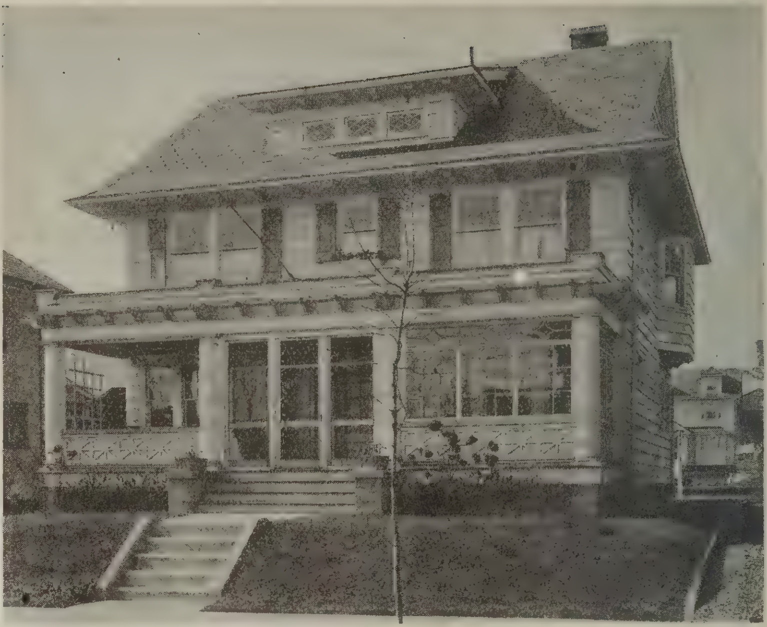
HOUSE AT SEATTLE, WASH.

Charles H. Alden, Architect

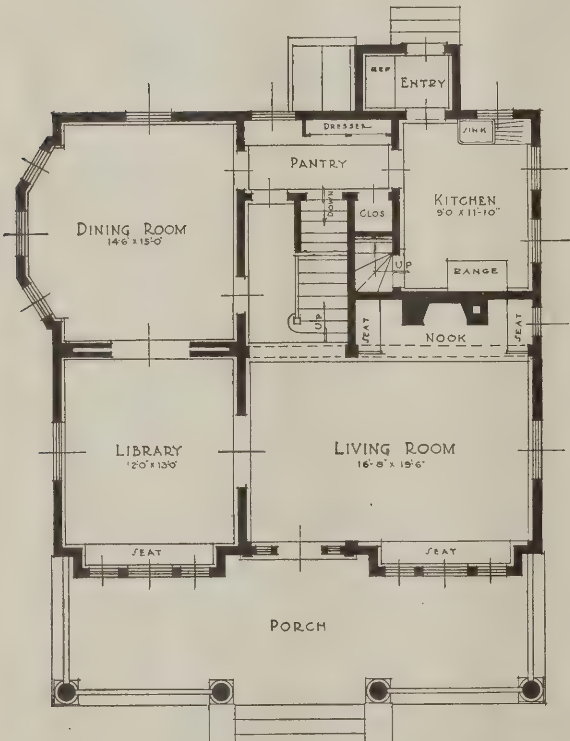
HOUSE OF FRED SCHOFIELD PATERSON, N. J.

Charles H. Benjamin, Architect

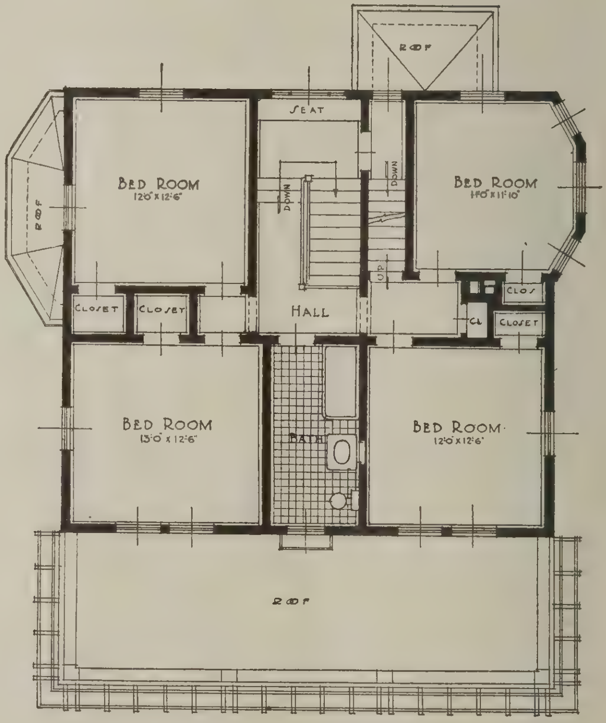
Exterior walls are of 2"x4" studs, sheathed and finished with ¾"x10" rebated white pine siding. All exterior woodwork is white pine, painted white, excepting shutters, which are painted a pale green. Roof is covered with slate. Gutters and leaders of galvanized iron, painted white. Chimney of brick. Living room fireplace of red tapestry brick with Colonial wood mantel and flanked by seat on either side. Living room has beamed ceiling. All trim throughout excepting dining room and library is of white wood with white enamel finish. First story floor of white oak with waxed finish. Library is finished with oak, stained silver grey. Dining room walls are paneled, 5'6" high, and finished with plate shelf.



Front View



·FIRST FLOOR·PLAN·

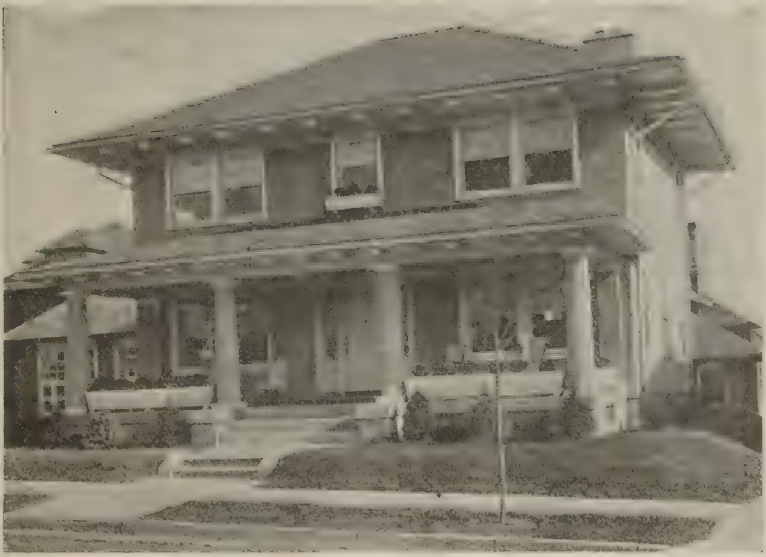


SECOND FLOOR·PLAN

Dining room trim is of red gum, stained to imitate Circassian walnut. Stairway is of Colonial design with birch treads, newels and handrails with mahogany finish. Remainder of stairway is white wood with white enamel finish. All walls are finished with flat paint. All doors are of birch, mahogany finished, with two panels. Doors of bed room closets are glazed, with mirror full height. Bath room is tiled, 4' 6" high.

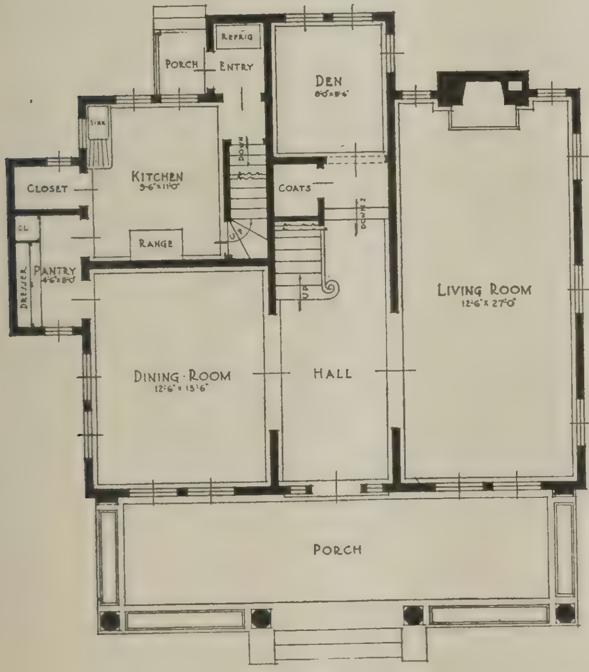
HOUSE OF WILMER A. CADMUS EASTSIDE TERRACE, PATERSON, N. J.

Charles H. Benjamin, Architect

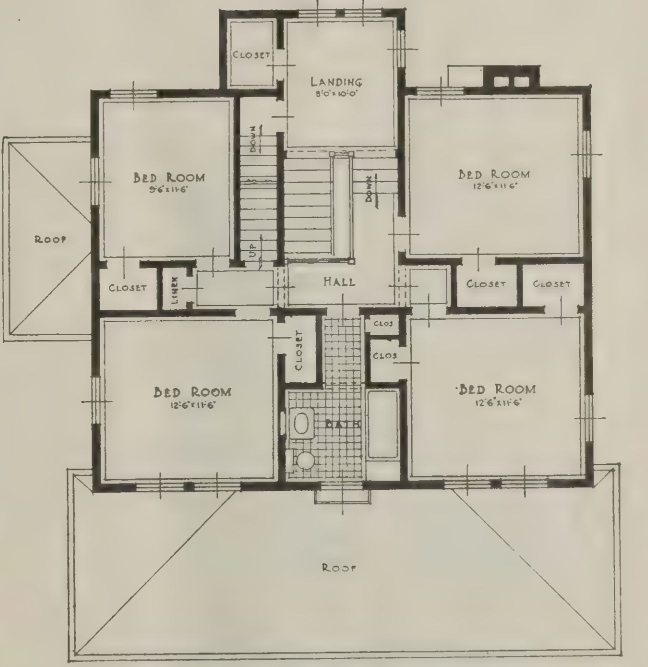


Front View

Exterior walls are 2"x4" studs, sheathed and stuccoed. Stucco is light grey in color with stippled finish. All exterior woodwork is white pine, painted white. All roofs are covered with mottled slate. Gutters and leaders of galvanized iron, painted white. Chimney is of brick, stuccoed. Porch floor is concrete with red cement finish, divided into squares and plain cement border. Porch columns finished with stucco and wood cap. Living room fireplace is of red tapestry brick with Colonial mantel. Living room has a beamed ceiling. All trim throughout excepting dining room is of white wood with white enamel finish. Dining room walls are paneled 5′ 6″ high and finished with plate shelf. Dining room trim is of red gum, stained to imitate Circassian walnut. First story floor and large stair landing are of oak with waxed finish. Stairway is of Colonial design with birch newels and handrails, with mahogany finish, treads of oak and remainder of white wood with white enamel finish. All doors are of birch, mahogany finished, with two panels.

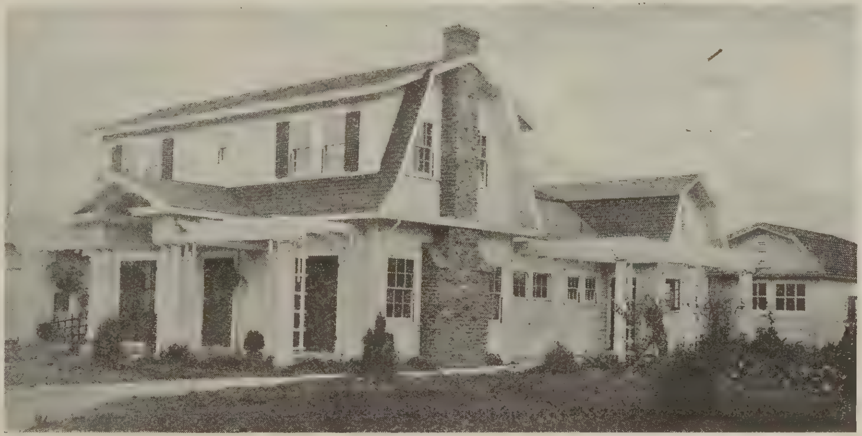


FIRST FLOOR PLAN

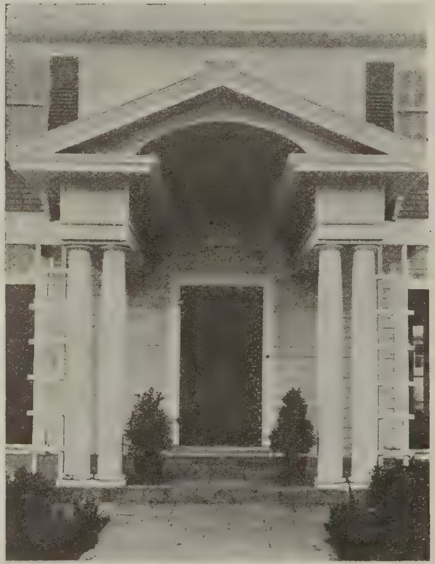


SECOND FLOOR PLAN

Doors of bed room closets and coat closet are glazed with mirror, full height. Bath room is tiled 7′ high around tub and 4′ 6″ high for remainder.



Front View

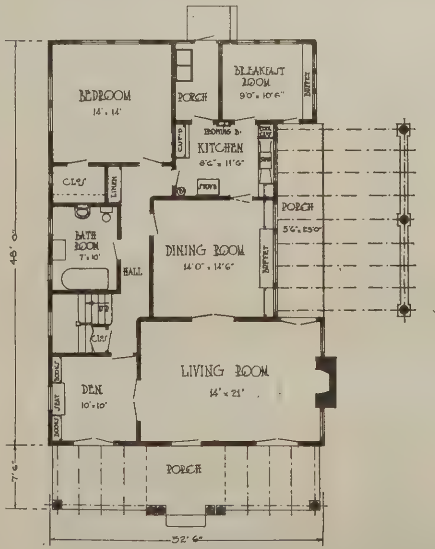


Entrance

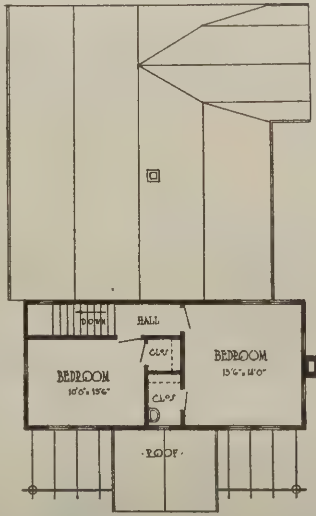
HOUSE AT STOCKTON, CAL.

JOSEPH A. PLECARPO

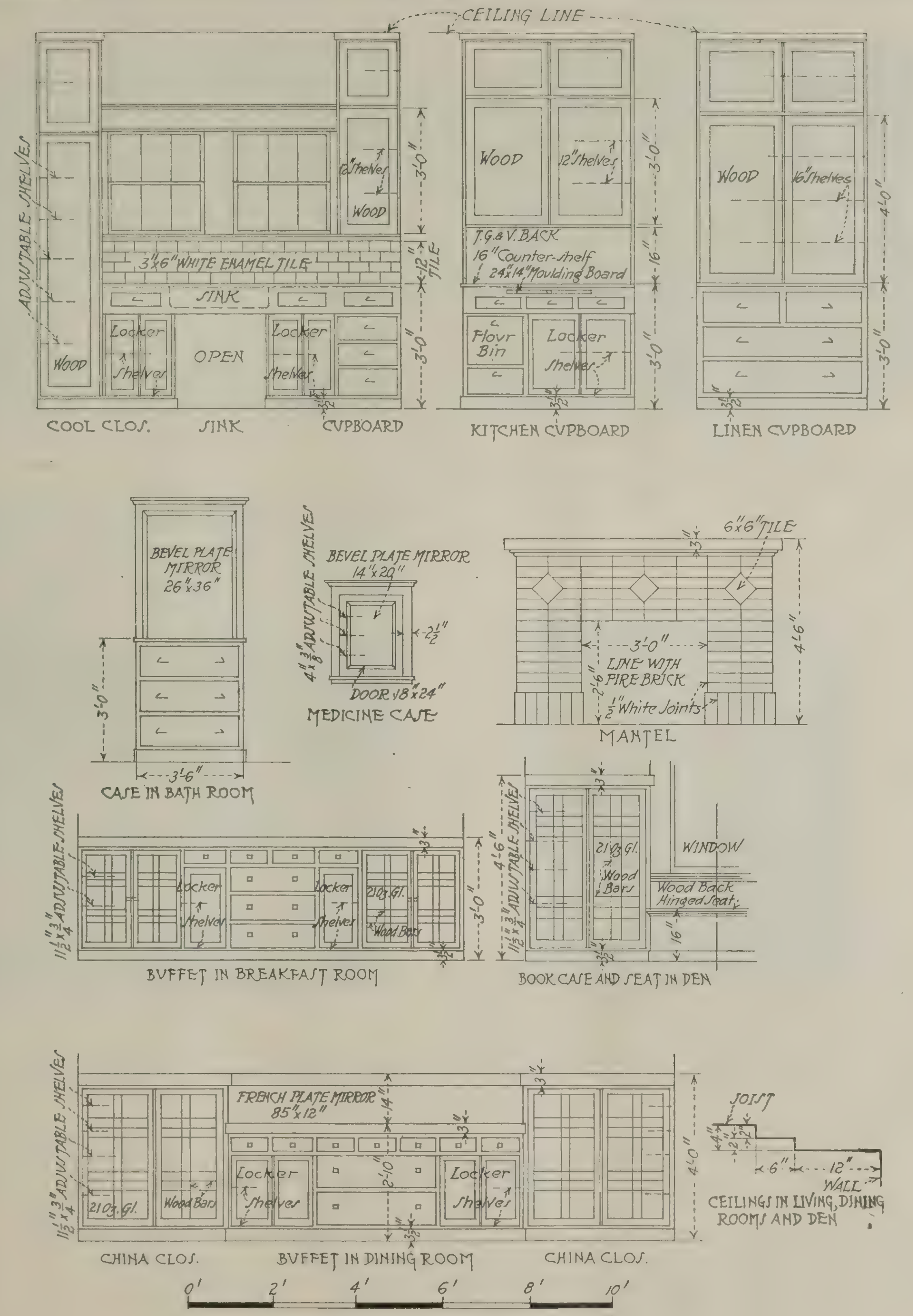
ARCHITECT AND BUILDER



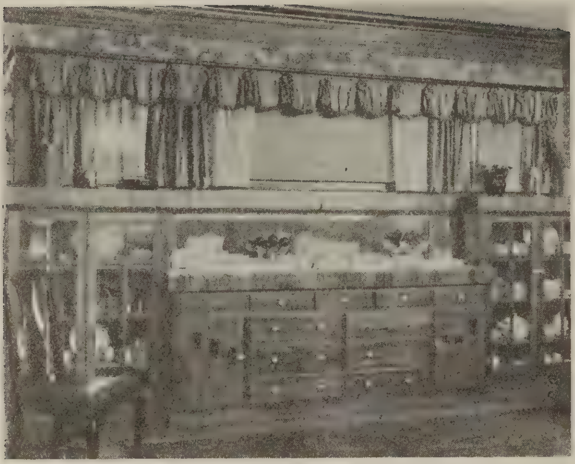
FIRST · FLOOR · PLAN ·



SECOND · FLOOR · PLAN ·

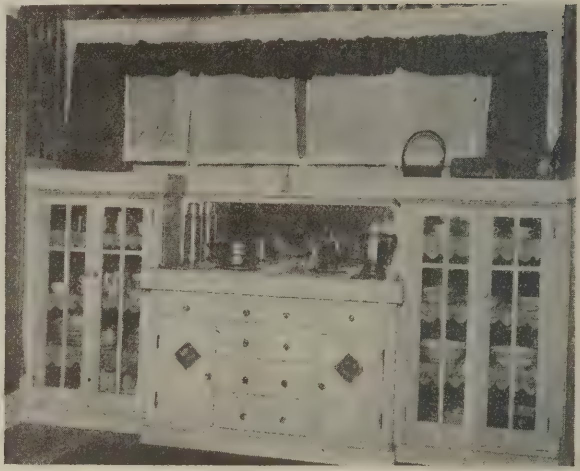


HOUSE AT STOCKTON, CAL.
Joseph A. Plecarpo, Architect and Builder



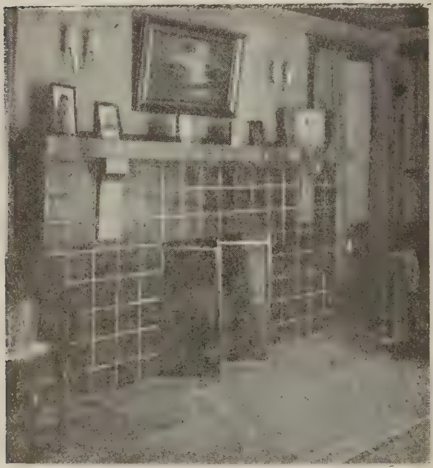
BUFFET IN DINING ROOM

In the dining room the buffet is finished dark to suit the panelling of the room. It is built in directly under three windows with a china closet on either side.



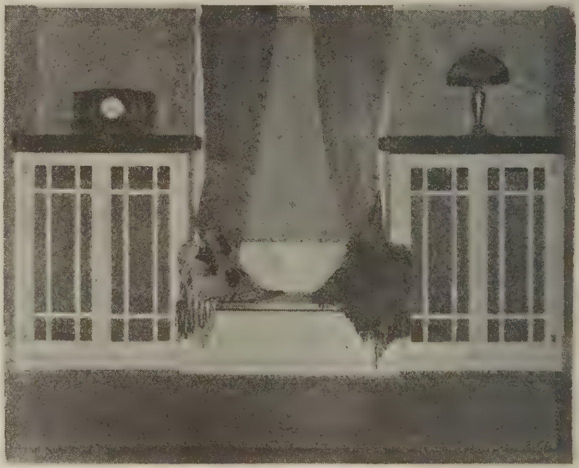
BUFFET IN BREAKFAST ROOM

The breakfast room buffet is finished in white. This, with the three windows over it and three windows in the adjacent wall, gives the cheerful air to the room so desirable in one's surroundings.



FIREPLACE

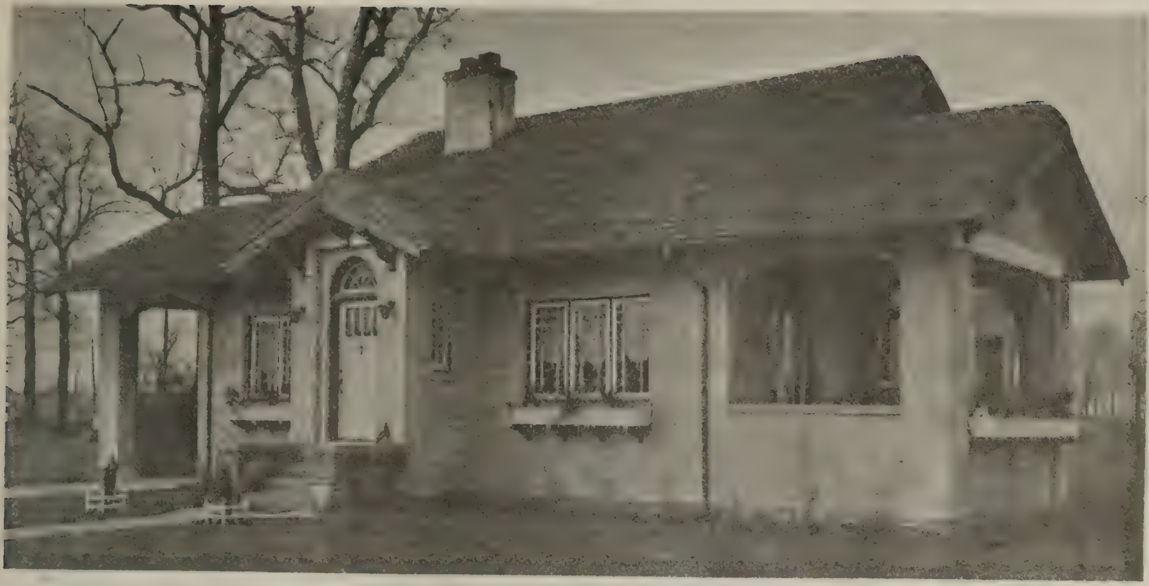
On either side of the fireplace is a window and electric wall bracket. The simplicity of design is pleasing.



WINDOW SEAT

The den has an attractive window seat with bookcase on either side. The white finish lends a cheer and wholesomeness to the aspect of the room.

INTERIOR DETAILS OF A HOUSE AT STOCKTON, CAL.
JOSEPH A. PLECARPO, ARCHITECT AND BUILDER

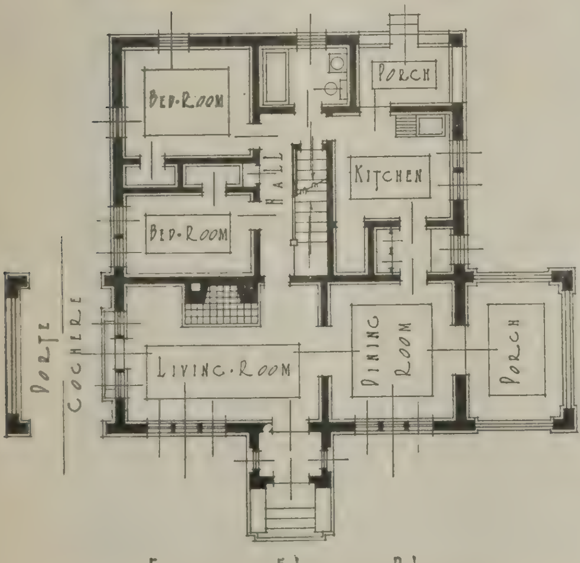


Front View

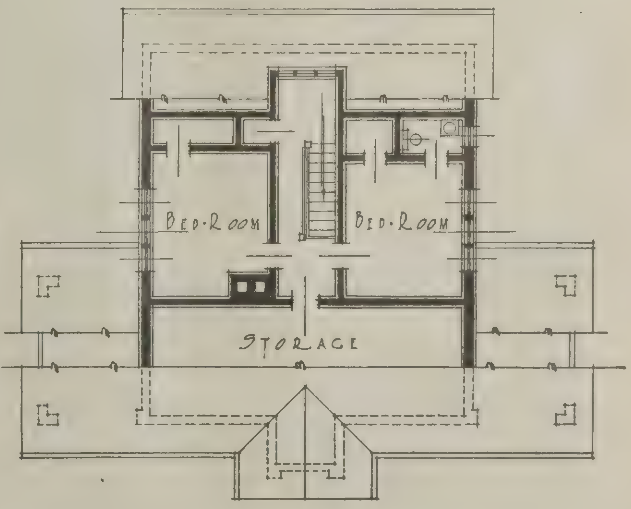
Living Room

HOUSE OF CARNEY CHESS,
TERRE HAUTE, IND.

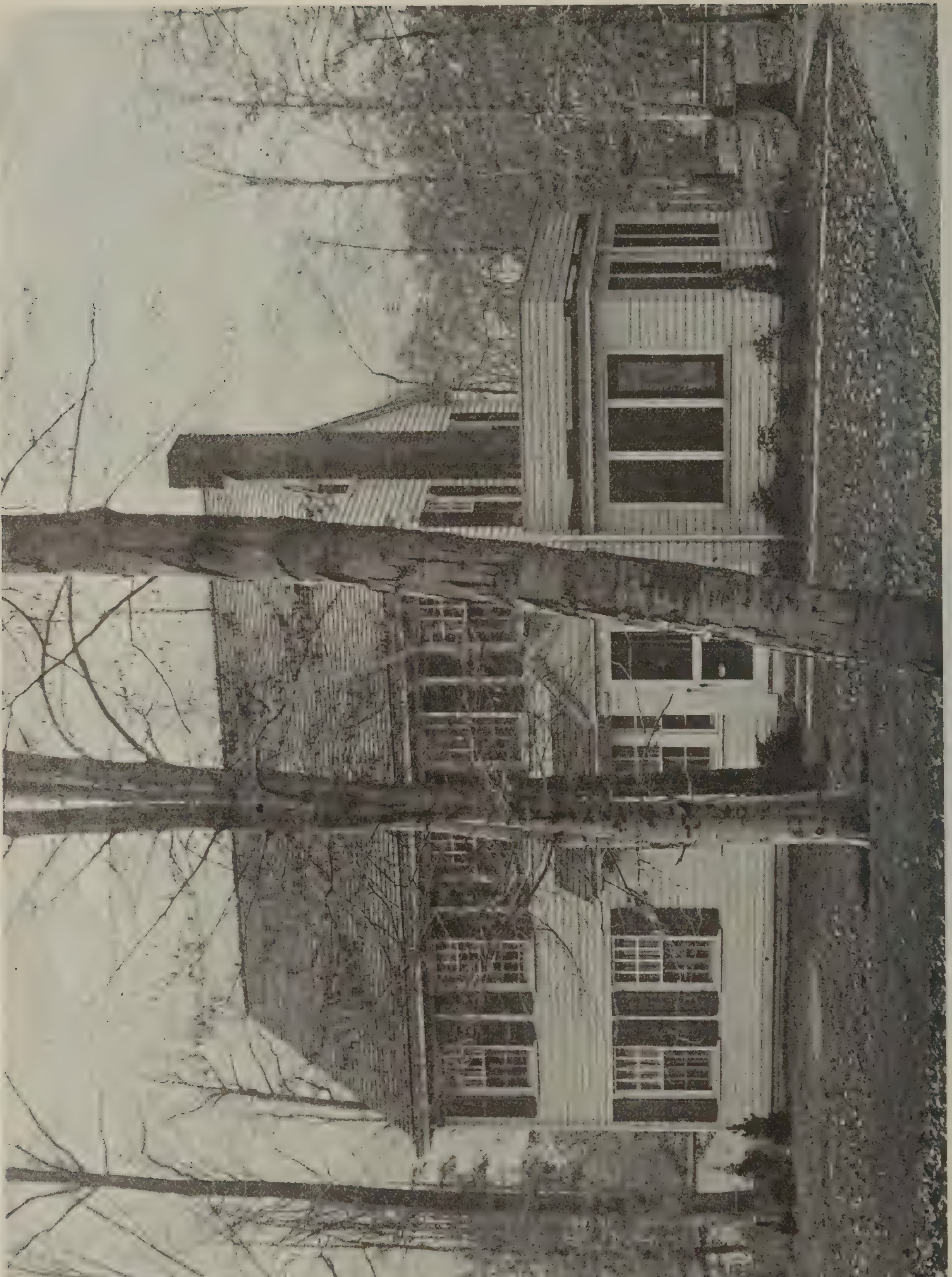
JOHNSON, MILLER & MILLER,
ARCHITECTS



·First·Floor·Plan·



·Second·Floor·Plan·



HOUSE OF GUY C. FOSTER, TENAFLY, N. J.
R. C. Hunter & Bro., Architects

House of Guy C. Foster, Tenafly, New Jersey.

By R. C. Hunter & Bro., *Architects*

THIS simple New England Colonial House combines economy in plan and construction, practical necessities in these days of high construction costs, and an attractive yet inexpensive exterior.

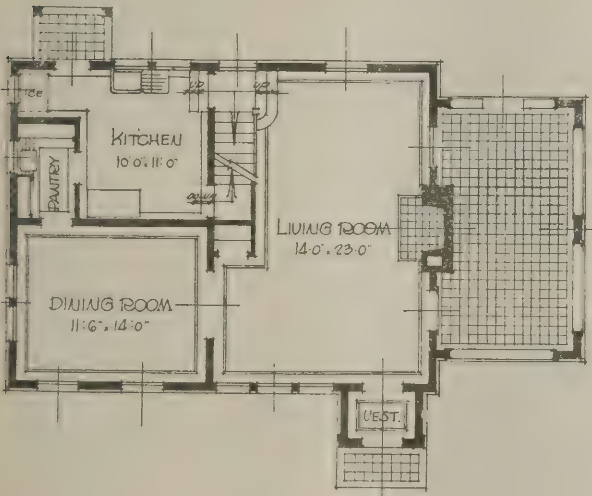
No matter how great may be the pressure of economy, there is no excuse for building inartistic houses. Even the most inexpensive local materials, if properly handled, give pleasing results, at least, when we are guided in their use by good taste and simplicity.

One often finds small houses burdened with a mass of "features" crowded together in a most oppressing manner that reminds one of a person who wears an overcoat in the summertime to show that he possesses one, regardless of the inconvenience and physical discomfort its use affords.

Our houses should have a substantial appearance; they should suggest comfort and good living rather than the desire for "show."

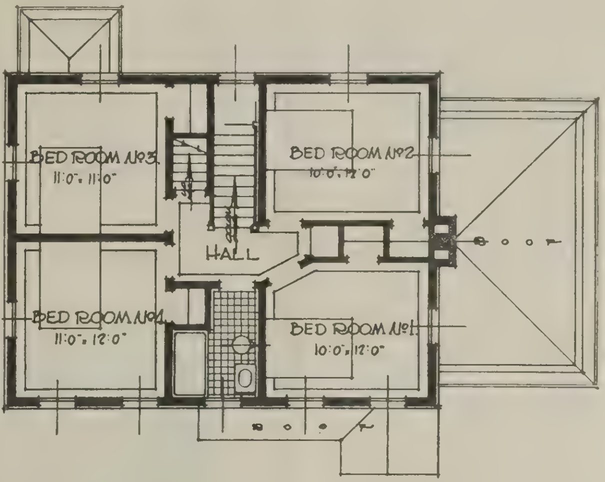
A simple straightforward house in the Colonial style, well proportioned and with the detail carefully chosen, always satisfies. If it boasts no unusual features, no "stunts," it at least does not violate the rules of good taste, and never goes out of fashion.

The house shown realizes to the full the beauty of simplicity that has been obtained with inexpensive materials. A feature worthy of note is the manner in which the large trees in front of the house were saved; the walk was led off to one side and the grass was induced to grow beneath the trees, thus none were sacrificed. These trees give a fine effect of age to the house, although it was but recently completed. The front lawn is not cut up with flower beds, but remains a pleasing unbroken carpet of green.



First Floor Plan

The first floor of the house is but three steps above the grade. This gives the delightful low appearance and avoids that unpleasant stilted effect so often found in small houses that are set high out of the ground.



Second Floor Plan

The large windows suggest cheerful interiors with plenty of light and sunshine. Their division into small panes with heavy muntins give a decided Colonial character to the house.

The floor plans are very compact and economical in arrangement. The main body of the house comes within a rectangle, the most economical form.

A small vestibule gives the required privacy to the entrance and serves to eliminate the usual hall, which, in a small house, often has considerable space that cannot be used to advantage. The stairs to the second floor start at the rear of the living room and land in the center of the house at the second floor. This arrangement allows the minimum size of hall in the second floor and also provides for the stairs to the third floor in an economical manner. A platform on the main stairs is also reached from the kitchen, a further convenience in getting up to the second floor without passing through the main rooms of the house.

The living room has a large open fireplace that is equipped with a damper and an ash chute to the cellar. This chute is a great convenience; it eliminates the necessity of taking up ashes, with the at-

(Coninued on page 48)

Building Frame Houses

Adequate Fire Stops and Correct Chimney Construction Are Essential Particularly in Frame Houses—Some Hints on Making Bungalow Exteriors Distinctive

By EDWARD MARPLE*

GOOD design is often misunderstood to mean attractive, well-proportioned houses, the plans of which are arranged to meet the demands of occupancy, while construction features are given only secondary consideration. Architects and builders who are aiming to establish a reputation for service know that well designed houses must consider the maintenance cost of the house as well as the layout and external appearance if they are going to build houses that are satisfactory. Good design must be practical as well as useful and beautiful.

Proper distribution of radiation of heat pipes is often left too much to the plumber. Fortunately the plumber is a pretty good judge of such matters because he has found himself in the position where he has not only to put in the job but lay it out as well. And often he often finds that the architect has not made allowances in his design that will permit of the best heating layout. This is discussed elsewhere in these pages.

Furthermore, builders should know that the roof should have less than ¼ pitch if it is to carry wood shingles. This means that the roof should have a rise of six inches in every foot or that the height of the ridge above the plate should be one-fourth of the span. All builders know this, but many do not follow it.

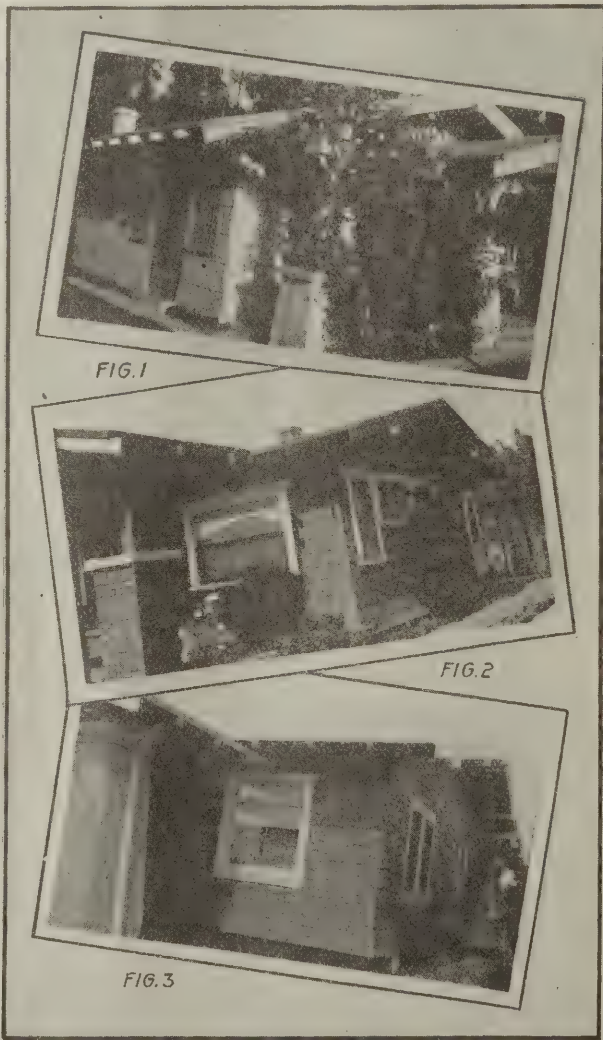


FIG. 1

FIG. 2

FIG. 3

Attractive Bungalow Exteriors

The rafters should be 2 x 4's or 2 x 6's and should not be spaced more than 2 feet on centers, according to the load the roof will support. Good grade of roofing boards should be used, 1 x 4, but not wider than 1 x 8, and should be spaced about 2 to 3 inches apart, using 8-penny nails.

Sixteen-inch shingles should be exposed to the weather 4 in. to 4¼ in., depending on the pitch, and should be stained to a depth of 8 in., at least. They should be dry when dipped, but if the shingles are not to be stained it is better to wet them thoroughly before laying. All shingles over 7 in. wide should be split, and no breaks allowed to come over each other on any three consecutive courses.

The importance of adequate fire stops in frame construction to retard the progress of fire is an established fact. The greater proportion of fires are of interior origin, and some method of fire stopping is therefore advisable and necessary. Methods adopted vary from the use of incombustible material laid in between studs to a height of from 4″ to 6″, to the nailing of boards over openings to prevent drafts from passing through the frame.

The principle in fire stopping frame construction is that of closing up all vertical openings between studs and horizontal openings between joists, and thus preventing the rapid circulation of fire by draft through the frame.

---

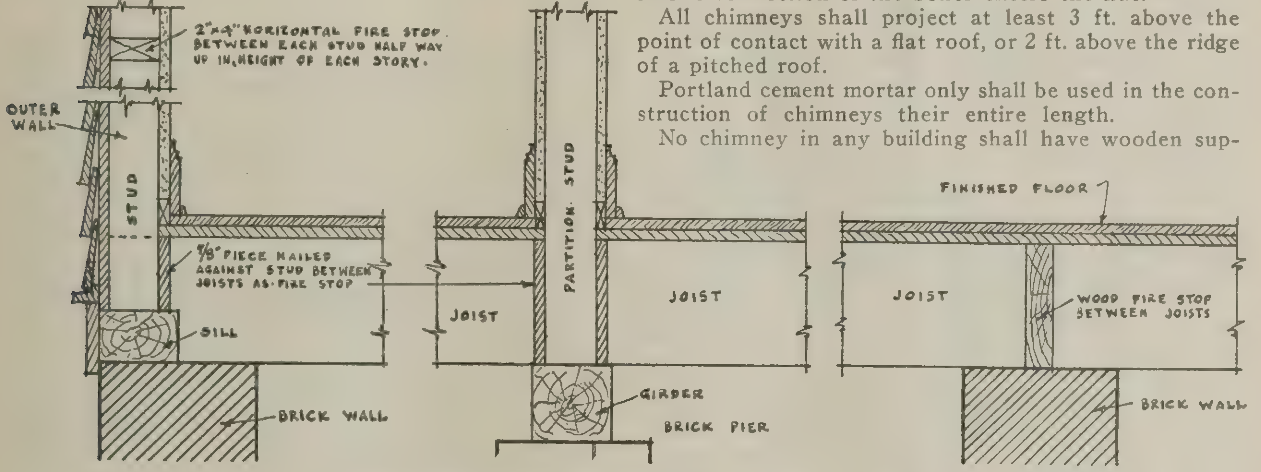
*Combined with valuable data furnished by the National Lumber Manufacturers' Association.

It has been the experience of fire chiefs that the spread of fire in frame buildings is due largely to the lack of proper fire stopping of this general character; therefore, the application of a remedy is urgently recommended.

Proper stopping with incombustible material will tend to confine a fire to a cellar or basement and prevent its rapid spread to stories above through spaces between the studs. This also applies to fire whose origin is in an attic, as sparks will drop down through the openings, causing fire below. A course of brick resting on a foundation wall between joists is recommended as a fire stop, and will also serve as vermin proofing.

There are places in frame construction such as along the top of brick partitions over which flooring is laid, where wooden fire stopping or a compressible incombustible material must be used; otherwise the shrinkage of the timber might in time cause the floor to distort or bulge.

Wooden fire stops in walls or partitions are best wedged in between the studs at a slight angle with the horizontal to avoid possible openings due to shrinkage and at the same time stiffen the frame.


2"x4" HORIZONTAL FIRE STOP. BETWEEN EACH STUD HALF WAY UP IN HEIGHT OF EACH STORY.
OUTER WALL
STUD
5/8" PIECE NAILED AGAINST STUD BETWEEN JOISTS AS FIRE STOP
SILL
BRICK WALL
JOIST
PARTITION STUD
GIRDER
BRICK PIER
JOIST
FINISHED FLOOR
JOIST
WOOD FIRE STOP BETWEEN JOISTS
BRICK WALL

Simple Methods of Fire Stopping in Common Use

Fire stopping also serves the purpose of keeping out rats and mice, preventing them from crawling up and down in walls and partitions. The cause of many fires has been attributed to vermin having worked their way into houses and gnawed at loose matches strewn carelessly about.

Another weak point in most house construction and one that is of especial importance in frame houses is that of chimneys. Chimney walls should be at least 8 in. thick, except where there is a well burned terra cotta lining or fire clay chimney tile which has been set in Portland cement mortar. In such cases a minimum thickness of 4 in. is sufficient, but the lining must be continuous from bottom to top. Flue areas less than 64 sq. in. are not advisable, except for flues with terra cotta linings, which may be either 7" x 7" square or 8" in diameter.

The following suggestions have been taken from the "Standard Building Ordinances" by the National Lumber Manufacturers' Association and form a valuable guide as to correct chimney construction.

Brick set on edge shall not be permitted in chimney construction.

Chimneys of all low-presure boilers, or furnaces, also the smoke flues for baker's ovens, large cooking ranges, large laundry stoves, and all flues used for similar purposes shall be at least 8 in. in thickness and be lined continuously on the inside with well-burned terra cotta or fine clay chimney tile set in Portland cement mortar. All such chimneys shall be capped with terra cotta, stone, concrete or cast iron.

The smoke flue of every high presure steam boiler, and every appliance producing a corresponding temperature in a flue, if built of brick, stone, reinforced concrete or other approved masonry, shall have walls not less than 12 in. thick, and the inside 4 in. of such walls shall be firebrick, laid in Portland cement mortar for a distance of at least 25 ft. From the point where the smoke connection of the boiler enters the flue.

All chimneys shall project at least 3 ft. above the point of contact with a flat roof, or 2 ft. above the ridge of a pitched roof.

Portland cement mortar only shall be used in the construction of chimneys their entire length.

No chimney in any building shall have wooden supports of any kind. Supports shall be incombustible and shall rest upon the ground or the foundation.

All chimneys which are dangerous from any cause shall be repaired and made safe, or taken down.

Metal smokestacks may be permitted for boilers, furnaces and similar apparatus where large hot fires are used, provided they have a clearance from all combustible material of not less than one-half the diameter of the stock, but not less than 15 in. unless the combustible material be properly guarded by loose fitting metal shields, in which case the distance shall be not less than 12 in. Where such a stack passes through a roof, it shall be guarded by a galvanized iron ventilating thimble extending from at least 9 in. below the underside of the ceiling or roof beams to be at least 9 in. above the roof, and the radius of the ventilating thimble shall not be permitted to pass through floors.

The fireback of every fireplace hereafter erected shall be not less than 8 in. in thickness of solid brickwork, nor less than 12 in. of stone lined with firebrick. When a grate is set in a fireplace a lining of brick at least 2 in. in thickness shall be added to the firebrick; or soapstone, tile or cast iron may be used, if solidly backed with brick or concrete.

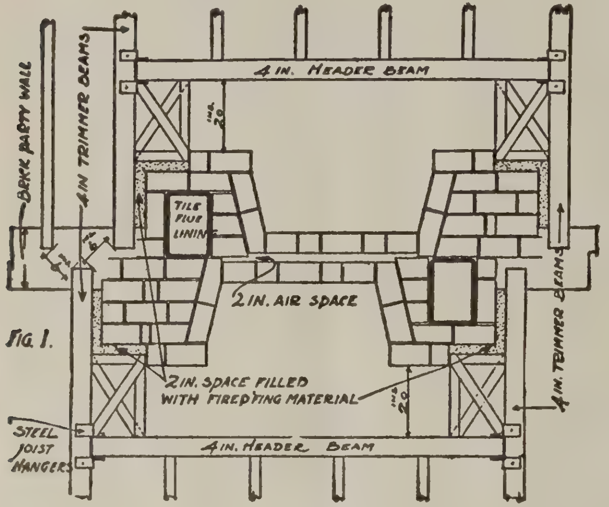


FIG. 1.

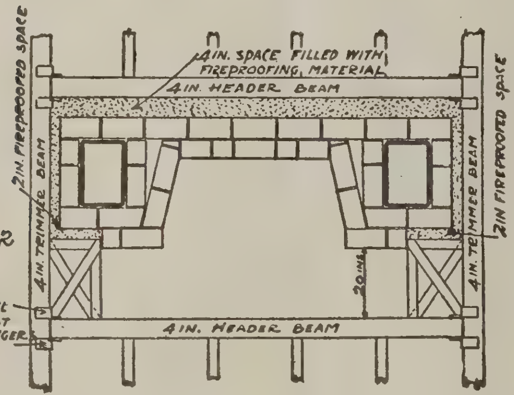


FIG. 2

Fig. 1—Method of Building two fireplaces back-to-back in a brick party wall to secure proper spacing between ends of floor joists. The space between backs can be filled if desired.

Fig. 2—Floor framing around a single fireplace. Note filling between framing and brickwork which serves both as insulator and firestop.

All flue-holes when not in use shall be closed with tight-fitting metal covers.

Ashes shall be kept in metal or other incombustible receptacles provided for the purpose. When the ash pit is located in a basement or cellar, enclosing walls and cover shall consist of at least 4 in. of brick or concrete.

Flues to be cleaned. All flues in every building shall be cleaned and all rubbish removed, and the flues left smooth on the inside upon the completion of the building. Once each year all flues shall be properly cleaned from top to bottom.

The worst single cause of fires is the defective chimney and to overcome the tremendous losses sustained therefrom, it is essential that architects, engineers, contractors and building superintendents should exercise extreme care, not only in proper design but also in the actual construction of all chimneys and flues.

Naturally these pointers are only suggestions, and where there are building codes they are to be complied with. But where there are no building codes or where such codes are lenient or incomplete, builders will make no mistake in following the suggestions here brought out, with the knowledge that their jobs are going to be just a little bit better than the next man's. And it is worth something to a client to know that his house is built in accordance with a code that may be a little bit better than the average building code. It gives him something that the other fellow hasn't got.

So much for the details of construction. But there are other ways of giving a client something that his neighbor hasn't, and there are many little tricks that give a distinctive appearance, particularly in houses of the bungalow type.

In southern California three-fourths of the houses constructed are built along bungalow lines. Many of these houses, it is true, incorporate other distinctive architectural features, but the bungalow idea predominates.

It has been said that the exterior finish of a house is as important to the dwelling as the clothes a man wears are to the man and very often it will

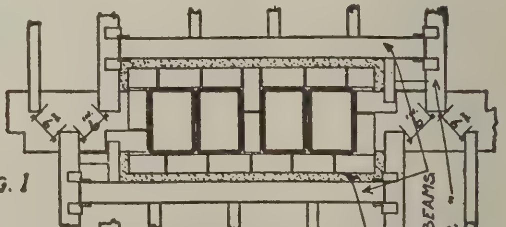


FIG. 1

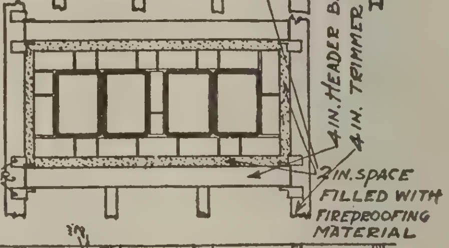


FIG. 2

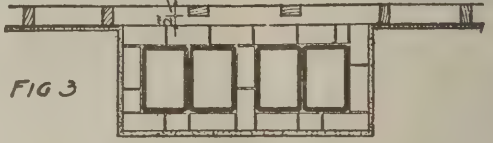


FIG 3

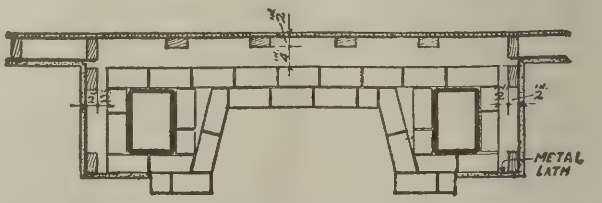


Fig. 1—Floor framing around chimney in a party wall to secure proper space between ends of floor joists.

Fig. 2—Ordinary framing around a chimney. All timbers 2 inches clear of brickwork and space filled with fireproofing material.

Fig. 3—Stud partition across back of a chimney showing proper method of arranging studs.

Fig. 4—Stud partition across back of a fireplace and around the ends of the chimney breasts, showing proper method of arranging studs.

be noted that the exterior finish of a house is typical of those who live within. In the same way that a good coat of paint will turn many a "barn" into a livable house, the pictures with this article show that a newly shaked or weatherboarded exterior will also make a pleasing and desirable change in the appearance. The photographs show a number of new ways that have been used in southern California during the past year or so to apply shakes and weatherboarding, in some cases combining the two on the one house. These effects have not just "happened," but are the result of real thought on the part of some of the leading architects in that part of the country and are worthy of consideration by those who are inclined to build a home along bungalow lines.

Fig. 1 shows how the shakes on a bungalow home in Tropico, California, were placed. These shakes are 6 in. by 36 in. and come either split or sawed. In this particular case they are of the split variety and are placed so as to be exposed 16 in. to the weather. They are painted a light gray, while the trim of the house is dark gray, the roof of light color composition, the colors harmonizing well with the concrete work about the house.

A unique way of applying shakes is shown in Fig. 2, these being run in irregular rows around the house with an exposure of 8 in. to the weather. The exterior of this house is dark green with white trim. Here the shakes used are of the sawed variety. The shakes in Fig. 3 are irregular in width as well as in length. They have been painted dark green, and with the trim, which is white, harmonize with the white roof and the light-colored concrete work about the house.

Two rows of shakes may be run close together with a stretch of about 12 in. between each two sets of two, as seen in Fig. 4. This is found in the exterior finish of a Glendale, California, bungalow. These shakes are an olive color, while the trim and roof are white. Two methods of applying shakes are shown in Fig. 5, and both may be used in the exterior of the same house. In the upper part the shakes are in sets of two each, while in the lower part they are in three even rows, each of the same width. These shakes are painted gray, the trim

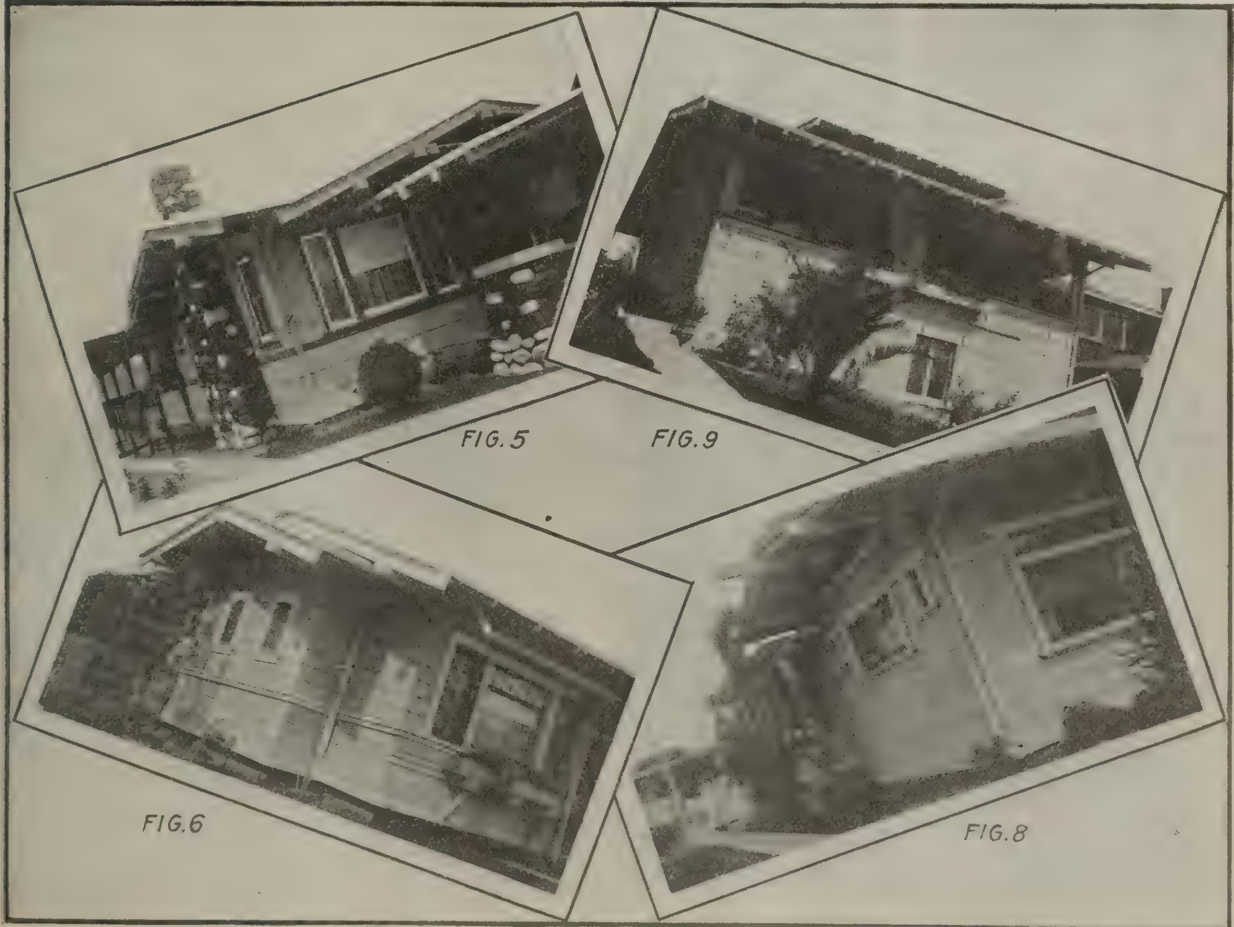


FIG. 5

FIG. 9

FIG. 6

FIG. 8

Unique Arrangements of Shakes and Weather-Boarding That Lend Distinction to the Bungalow drab and white, while the roof and concrete work are of a light color.

Shakes and weatherboarding may be combined with pleasing effect on the same house as shown in Fig. 6. The upper part of the house is taken up by shakes of the sawed variety, laid in even rows and having an exposure to the weather of about 8 in., while the lower portion is of weatherboarding, run in "triple" sets. Fig. 7 shows how weatherboarding may be run in the ordinary way around the house at the upper and lower sections, with a strip of shakes about 4 ft. in width between.

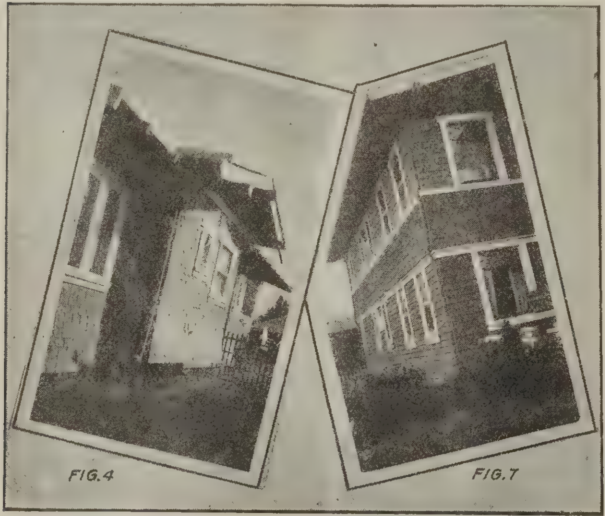


FIG. 4

FIG. 7

Another novel way of placing weatherboarding is shown in Fig. 8. Here the boards are placed in pairs from the bottom of the wall to the top, and are a pleasing variation from the regular method. Triple sets of weatherboarding (Fig. 9) on the sides of a house are often used. The picture shows a Los Angeles house that was one of the first to be treated in this manner. It is painted gray and has a shingled roof.

It would seem, therefore, that there is no necessity for building a house just like every other house on the street. The suggestions offered here are only a few of the many designs that may be effected. It is just such little tricks that lend distinction and character to a house.

Tax Exemption Ordinance, N. Y. City

(*Continued from page* 25)

Sec. 2. It is further ordained that such exemption shall be granted to the extent only of one thousand dollars for each living room, including the kitchens, but not including the bathrooms, in each such building, provided that the total amount of such exemption shall not exceed, for every single-family house coming within the terms of the statute, five thousand dollars of the value of the building, and for every two-family house coming within the terms of the statute ten thousand dollars of the value of the building, and for every multi-family house coming within the statute, an amount of the value of the building equivalent to five thousand dollars for each separate family apartment therein contained.

House of Guy C. Foster, Tenafly, N. J.

(*Continued from page* 43)

tending dust. A connection is also provided for a gas log should one be desired.

A comfortable enclosed living porch is provided, with glazed doors to the living room and to the garden in the rear.

The dining room is well lighted. The kitchen and pantry are conveniently arranged and completely equipped.

The second floor shows four bedrooms, a bath and plenty of closets. All of the bedrooms have cross ventilation and ample space for furniture. The bathroom is tiled and has a built-in tub with the plumbing pipes run in the adjoining closet.

On the third floor is a servant's room and bath.

The laundry, heater and coal storage spaces are provided in the cellar.

The interiors are treated in the Colonial style to harmonize with the exterior. Woodwork is enamel finish; doors, stair treads, etc., birch mahogany. Floors are oak.

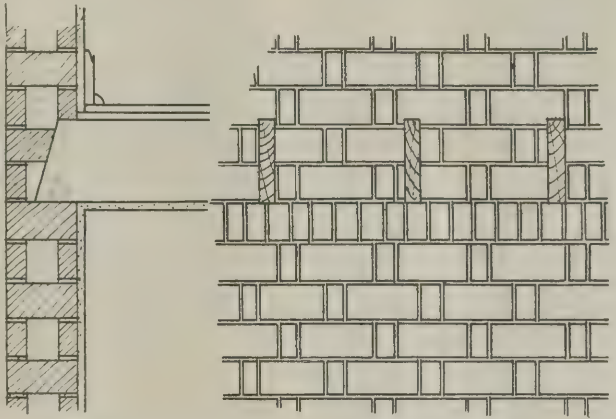
Brick for the Home Builder

A New Type of Wall Has Been Developed That Cuts 30 Per Cent. from the Cost of Brick Construction

IN THE recent development of the hollow wall, brick is making a strong bid as an economical and substantial material for small houses. The problem of cutting down the cost of construction in spite of the fact that brick and bricklayers are going to be able to demand fairly high prices is met by cutting down the number of brick required.

The brick house has always been an economical proposition because it is substantial. But with the wall herein described an actual saving in dollars and cents is possible on the first cost of the building to say nothing of its maintenance and depreciation.

This wall is constructed so that there is no dead air space. Good ventilation, therefore, insures dryness and the fact that there is an air space within the wall insures insulation from heat in the summer and cold in the winter. The absence of any mortar joint running through the wall prevents any capillary action that would draw moisture to the inside wall and cause dampness in that way.


Section Interior Elevation

Showing general construction of wall

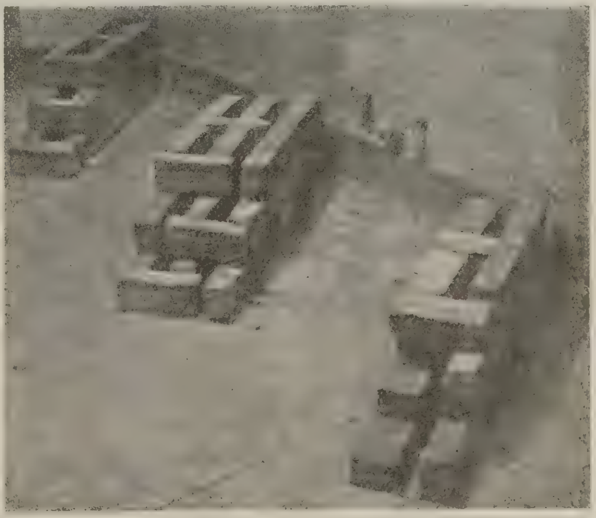
In building these walls the brick are laid on edge. The outside wall may show either the "rowlock" face or ordinary face of brickwork. In either case, rowlock backing is used. This permits the use of any of the ordinary bonds and there is no radical difference in appearance from ordinary brickwork.

Mr. Paul R. Smith is the architect for a development of houses in New Jersey using this type of wall. Some of these houses have been occupied for a year and have given no indication of dampness in spite of the fact that the walls are plastered directly on the brick with no furring. At Phillipsburg, N. J., the bricks used were common brick "culls," twisted and deformed so that in many cases they could not be used for backing even in an ordinary wall.

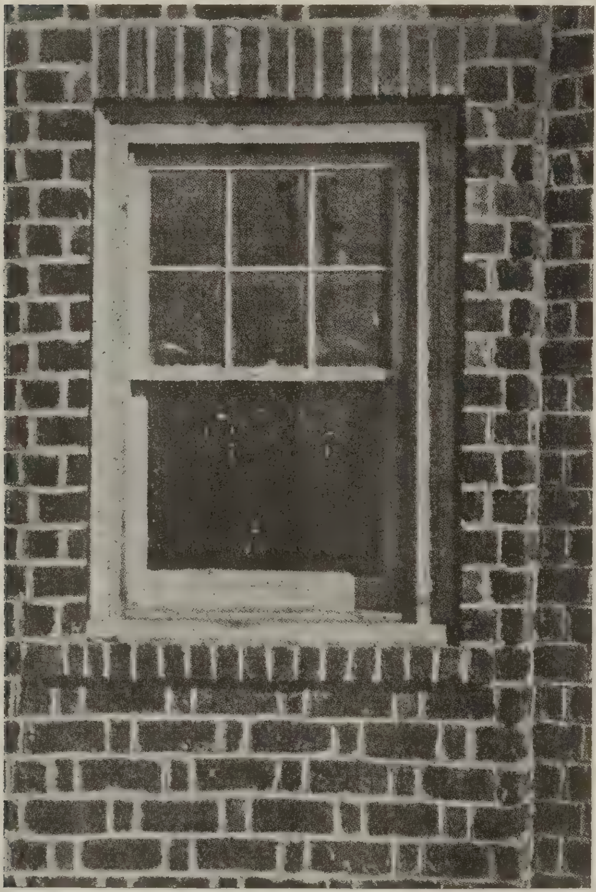
In New Jersey these brick walls were only eight inches thick, but no effort was made to ventilate them, which would have meant additional thickness.

Besides the good ventilation, insulation and damp-proof features of this wall, it has shown

House Built at Phillipsburg, N. J.
Paul R. Smith, Architect

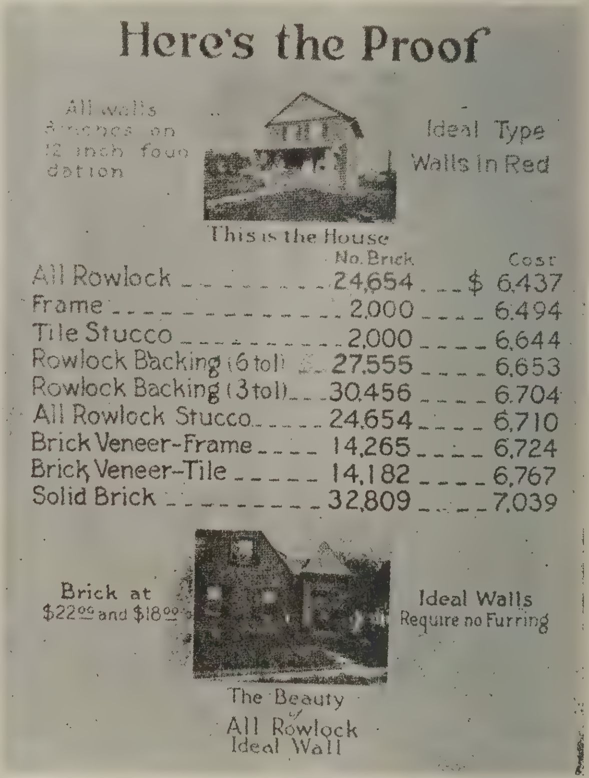

Specimens Showing Different Methods of Laying
Brick Hollow Walls for Thick or Thin Walls

stability of construction that has surprised even the architects who have developed it. The number of brick used in the wall of a house is reduced 15 per cent. A bricklayer can put up more square feet of wall in a day, thereby saving labor cost and time of construction, which means reduced overhead cost and superintendence. In the buildings that have been built so far the total cost reduction has been as much as 30 per cent. of the cost of the solid wall.



Close-Up View of Wall, Showing Appearance of Brickwork

Brick of the usual size are used and the adoption of the new type entails no expense to manufacturer or contractor. It simply is an improved way of laying brick, producing an absolutely dry wall, summer or winter, as strong and durable as the solid wall, with a saving of 25 per cent. or more in material and labor. The interest of the industry is now centered upon this new idea, and it offers the one ray of sunshine in what would be a rather gloomy situation.



Here's the Proof

This is the House

	No. Brick	Cost
All Rowlock	24,654	$ 6,437
Frame	2,000	6,494
Tile Stucco	2,000	6,644
Rowlock Backing (6 to 1)	27,555	6,653
Rowlock Backing (3 to 1)	30,456	6,704
All Rowlock Stucco	24,654	6,710
Brick Veneer-Frame	14,265	6,724
Brick Veneer-Tile	14,182	6,767
Solid Brick	32,809	7,039

All walls 8 inches on 12 inch foundation
Ideal Type Walls in Red
Brick at $22.00 and $18.00
Ideal Walls Require no Furring
The Beauty of All Rowlock Ideal Wall

Estimates of the Comparative Cost of Same House in Nine Different Forms of Construction

This type wall has been in use in California for some months. Manufacturers in that state say the idea has caught "like wildfire," and its extensive use is the reason why California manufacturers are busier than those of any other section of the country.

Tests are now being carried on to determine if that type of wall will meet city building code requirements. Once its status as an approved design is secured a large increase in the consumption of brick is looked forward to.

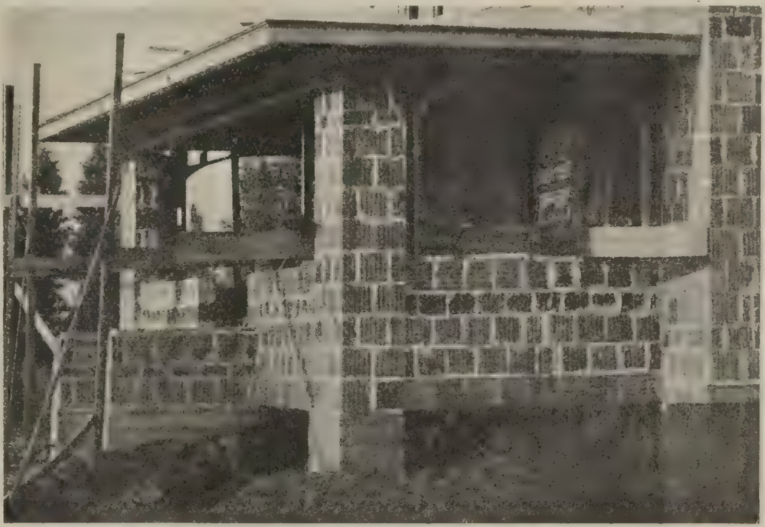
Stucco on Hollow Tile Houses

Advantages and Details of Hollow Tile Construction for Stucco Houses, Foundations, Walls, Lintels, etc.

HOLLOW tile is finding a wider use in the construction of foundations, walls and floors of houses today than ever before. This is due largely, perhaps, to the fact that builders of houses are beginning to appreciate the fact that the use of this material is not limited to larger construction work such as industrial and office buildings, but is developing a real field in the building of small houses as well.

In considering the hollow tile wall remember that the strength of any wall is chiefly dependent upon two factors: first, the material or units of which it is built, and second, the method of joining or building the material or unit in place.

With all forms of hollow building tile construction only a cement mortar should be used, and the amount of mortar required is comparatively so small that there is little reason for using anything other than a good rich mixture. A wall of hollow tile properly laid in a good cement and lime mortar will develop about 60 to 75 per cent. of the strength of the tile. This assures a very strong wall.



Porch Built of Hollow Tile on Concrete Pier Foundation

Note reinforced beam of hollow tile carrying wall and floor. These beams are constructed same as lintels shown on page 52

There is a peculiar analogy between the methods of laying up hollow tile and the comparative strength of these methods which may be explained in the following manner.

The difference in volume and bed of the mortar joint between side construction and end construction offsets the difference in ultimate crushing strength of the tile, when built up in the wall, between side construction and end construction.

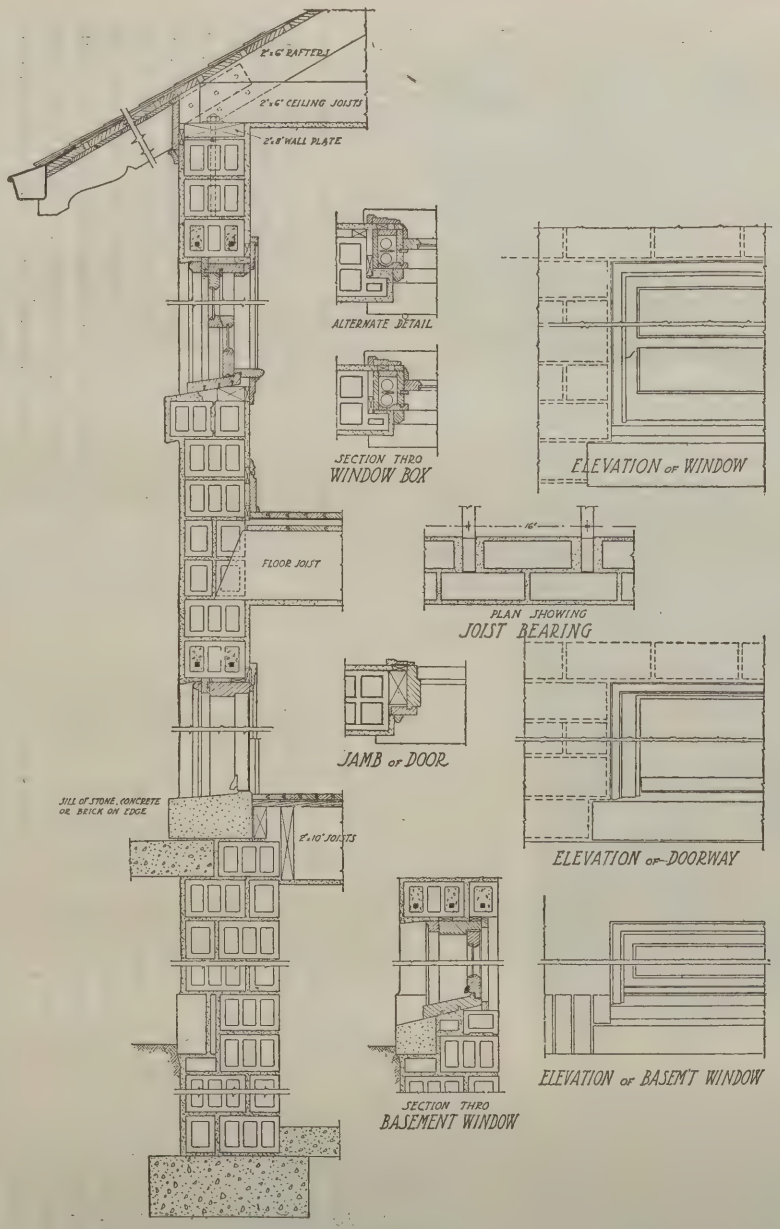
Therefore, regardless of the method used, the strength of the finished wall is about the same. So it is a matter of choice based on personal preference and other considerations as to which form of construction should be used.

Closely connected with the question of strength is the question of depreciation of the material itself. The cementing medium must also be considered.

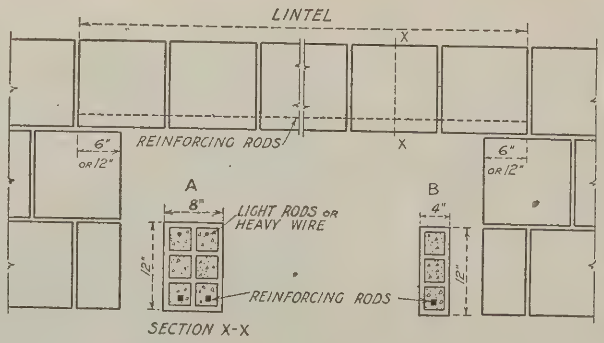
In hollow tile construction there is practically no depreciation of the material itself. The cementing medium is almost equally as permanent. The construction is further protected because in most forms of hollow tile wall construction the cement joints between the tile are covered and protected from the elements by the stucco finish or veneer of brick or stone.

Considering the insulating value of this material, heat or cold may penetrate the walls of a building in two ways: first by conduction through the solid material of which the wall is built, as all materials are more or less conductors of heat and cold, and second, by leakage, either through the wall construction or around window and door frames.

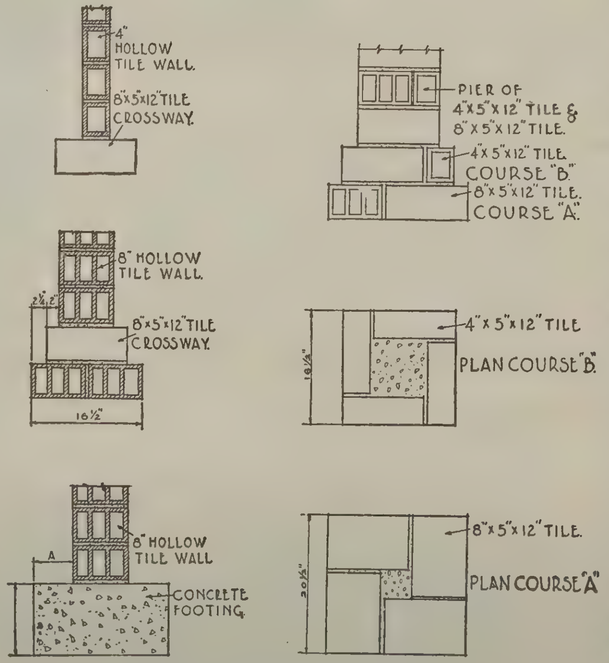
There can be no appreciable leakage through any dense masonry material, and the hard burned clay of hollow tile is an effective bar to any such leakage. Furthermore, there is no leakage around door and window frames that are properly set and caulked tight. Conduction is the only way by which heat or cold may be transferred through a hollow tile wall. Dead air is the poorest conductor of heat, and for this reason it is utilized for the purpose of insulation in hollow tile construction. Air cells are built into the wall in such a manner that any conduction of cold through the solid material is absorbed within the wall itself.



Typical Section Through Stuccoed Hollow Tile Wall—
Side Construction



Detail Lintel and Beam Construction



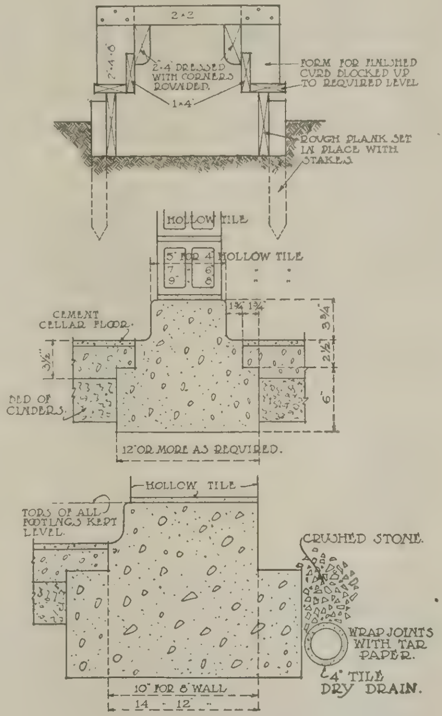
Typical Hollow Tile Footings

CONSTRUCTION DETAILS STUCCO AND HOLLOW TILE HOUSE

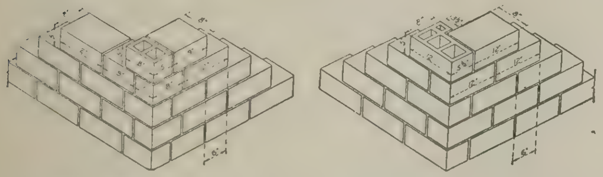
This insulating effect is less with the thinner sizes of tile that have only a single air cell through the thickness of the wall and is multiplied by the number of cells that are added by any greater thickness of wall.

The furring of any wall adds to its insulating value, as it adds another air cell and further removes the interior plastering or other finish from direct contact with the wall proper. Thus for the small residence where only an 8-inch thickness of wall is generally used, it is advisable to have the added insulation advantage and the resultant saving in fuel.

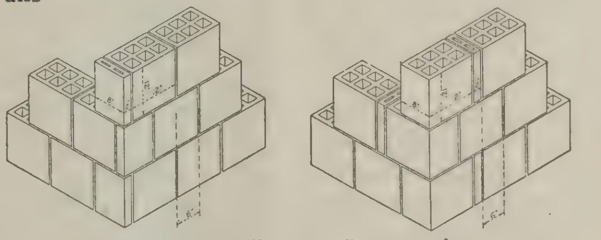
It is not necessary to furr a hollow tile wall in order to avoid cold or dampness. Probably 50 per cent. of the hollow tile walls that are built have the plastering applied direct to the tile without furring. But furring is nevertheless an advantage that well repays the slight additional cost in residence buildings. As the walls increase in thickness furring becomes of less and less value and for all ordinary temperature extremes there is a question if any advantage is gained when the wall is 16 inches or more in thickness.



Typical Detail Concrete Footings for Tile Walls



Corner Bonds for Eight-Inch Wall—Side Construction



Eight-Inch Wall—End Construction

There are two ways by which the inside surface of any wall may become damp or wet; first, by absorption of moisture from the outside, either from rain, snow and damp outside air or by capillary attraction from the moist ground in contact with the lower portion of wall, and second, by the condensation of moisture from the interior atmosphere, generally referred to as "sweating."

Condensation or sweating is a condition that is common to all walls under certain conditions and may occur with any form of wall construction however perfect the insulation that particular construction may afford. Where the interior air becomes over-saturated or laden with steam from cooking and laundry work, the only cure is ventilation, or the circulation of dry air. Condensation will naturally occur to a much greater extent with walls that have a low insulation value, and the wall of hollow tile is therefore less liable to this condition than most other forms of construction.

In residence buildings all troubles from condensation generally originate with the cooking in the kitchen or from laundry work and can usually be entirely eliminated if a hood is placed over the range or cook stove, connected by a register to the flue or vent.

Hollow tile is burned to a density that renders its absorption too low to cause trouble even under the most severe weather conditions. In order that no portion of damp-resisting properties of the hollow tile wall may be lost, the cement mortar used in laying the tile should be a dense mixture, and for that, as well as other reasons, it is customary to add about 15 per cent. of hydrated lime to the cement. Cement mortar is always more absorbent than the hollow tile and this addition of lime should not be omitted, except where a waterproofing compound is used in the mortar.

For small or moderate sized residences, garages, stores, and similar buildings, hollow tile foundation walls have ample strength and are in every way satisfactory.

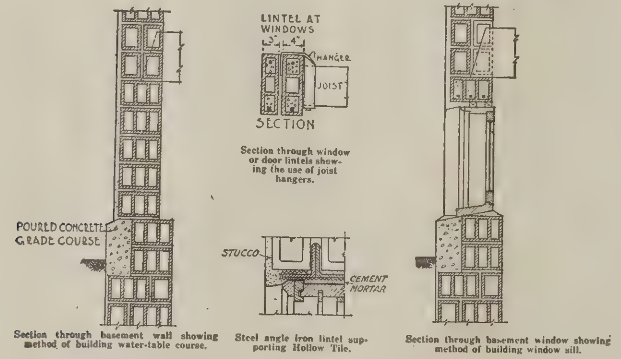
When the foundation walls are built in an occasionally saturated soil, the exterior face should be plastered with a water-proofed coat of cement mortar in order to insure the sealing up of any small openings in the mortar joints.

Such footings afford natural drainage under the foundation, are easy to lay, can be built upon immediately, and have ample strength to support the entire superstructure weight with a suitable factor of safety.

Care should always be taken in the building of a foundation to see that masons thoroughly bed all tile with well-filled mortar joints and that a good dense cement mortar be used. As foundation walls are seldom furred or plastered, the fact that they are free from condensation makes this construction suitable for basements or cellar walls.

Some builders fill the cells in hollow tile foundations with concrete. This is *not* usually necessary and is not done to strengthen the carrying capacity of the foundation, because it adds very little to the supporting strength, but to add to the dead weight that *may be thought necessary* to provide stability against earth pressure.

Jambs, piers or mullions are capable of supporting the extra dead weight and other loads transferred by the lintels or arches which span the openings. The jambs may be flush, set out or recessed as desired. Lintels or arched openings properly constructed are sufficient to carry both the dead and live loads that occur at this portion of the wall without appreciable deflection and transmit these loads over a suitable beaming area of the jamb, pier or mullion.



Section through basement wall showing method of building water-table course.

Section through window or door lintels showing the use of joist hangers.

Steel angle iron lintel supporting Hollow Tile.

Section through basement window showing method of building window sill.

Construction Details

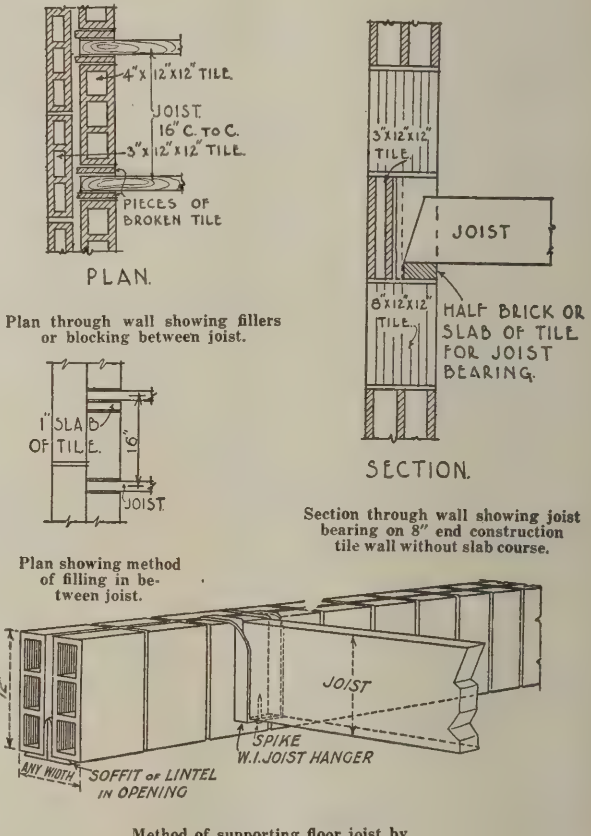
The wall or piers are also effectively tied together over the opening. Structural steel shapes are unnecessary except over the very wide openings and the need for strong arches, keystones and trimmer beams is done away with. It is equally practical to provide for arches, pannelled tympanums, recessed spandrels, flower boxes or balconies, with or without special material, and without impairing the structural details and their necessary carrying capacity.

Reinforced tile lintels are the simplest, cheapest and most practical that can be used. These lintels when placed in the wall simply continue the regular coursing of the tile.

The sills may be finished the same as the balance of the wall or any desired type of sill may be used such as stone, brick (flat or on edge), terra-cotta, cast concrete or other material.

Door sills may similarly be of various types and materials, stone, brick or concrete generally being used. Either wood or metal frame windows may be used.

Hollow tile walls are so constructed that pockets for joists may be built into them with practically no reduction in the bearing area, and the proper bedding of these joist, or beams and the distribution of the load is taken care of by the bonding of the tile units.



Plan through wall showing fillers or blocking between joist.

Section through wall showing joist bearing on 8" end construction tile wall without slab course.

Plan showing method of filling in between joist.

Method of supporting floor joist by means of joist hanger where joist occurs at window or door lintel.

Details Floor Joist Supports

The tile fits tightly about the ends of the joist giving no opportunity for side movement and making the floor rigid.

In vertical construction a bearing plate or slab of tile is used and the load is thus distributed over a considerable bearing area. Joists should always have a wall bearing of at least 4 inches and should have a 3-inch fire cut.

This insures a bearing on at least two of the longitudinal members or about 3 sq. in. of shell and web area.

As the minimum carrying capacity of the tile is 1,525 pounds per sq. in. net area, this provides a bearing value of 4,575 pounds under each joist end.

This load is impossible for any ordinary 2-in. joist to carry, even if spaced 12 inches on centers for a floor load of 100 lb. per sq. ft.

Other features of hollow tile construction will appear in a later issue of BUILDING AGE.

Heating the Small House

There is always some best system for each individual case. Each system is described and the advantages discussed.

By W. R. EATON

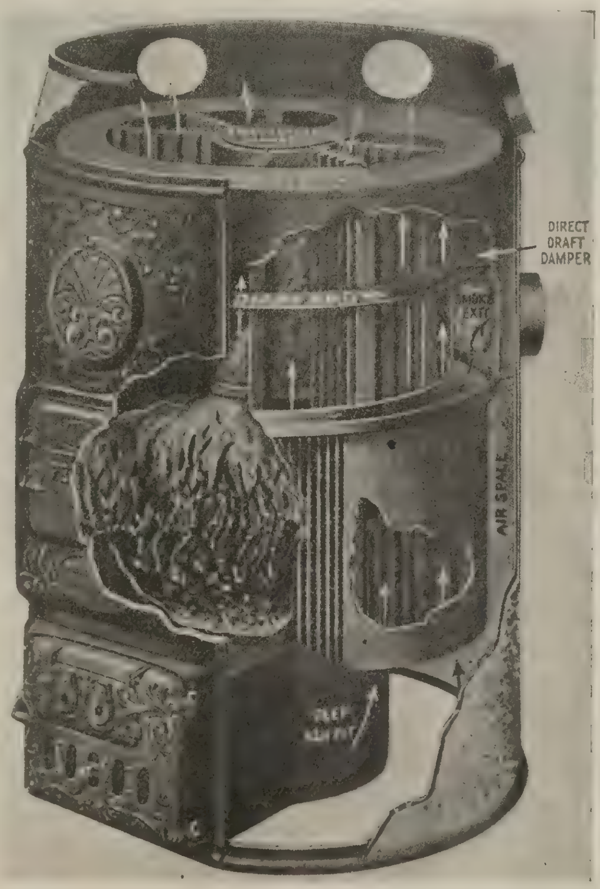
THE heating system determines the value of the house—its value for living, its value as a permanent investment, and its value for selling if it ever is to be sold. The worst mistake that a builder can make is to "skimp" on this essential.

A good system does not mean an extravagant system. It means only the prudent avoidance of the cheapness which saddles the home with an inadequate heating plant and entails endless puttering, discomfort, and a waste of coal which would more than pay for a good system.

The real cost of comfort is in the cost of daily operation. Dirt, repairs and wasted time alone are important items in this cost, but the big cost, that is noticeable daily, is the drain on money caused by the coal bills. There is nothing that causes more bitter regret than a mistake in selecting a heating system. It is a mistake that never ceases to penalize the person who has made it; and a grave feature of it is that it is almost impossible to remedy it except at considerable expense.

The right heating system is one that does not cost a single dollar more than is absolutely necessary to give complete service.

Heaters, boilers, radiators, pipes and other equipments of a heating plant in general superficial aspect are largely alike to the inexperienced eye. It is true that there is an impression of quality about a good system that even the non-technical man can see; but the vital merits or demerits appear only after the system is installed and in action.



Sectional View of Interior of Hot Air Furnace

Efficiency depends on almost innumerable points, great and small; the correct proportionate areas of grate surfaces, heating surfaces, flues, pipes, etc.; the durability of all the construction; the science that draws all available heat from the coal—for all these and many other values the purchaser depends in the final analysis on the reputation and known ability of the manufacturer.

There are four sound methods of heating the home:

(1) Warm air
(2) Steam
(3) Vapor-vacuum-pressure
(4) Hot water

Each has its own decided merits and adaptations for specific conditions. The "best" is the one that is best for the particular, individual case.

The initial cost of warm air is the smallest of all systems. It provides healthful heat, for it operates by means of the continual circulation of fresh, warmed air. It is adjustable to mild or severe weather, and is adapted to the usual house. Its cost of operation is low. It is economical of fuel and repairs.

The first cost of a steam heating plant is more than for a warm air installation, but less than for other water systems. The pressure and temperature necessary to create steam make it a powerfully driven heat. It will heat the usual building, and it will heat a whole group of buildings.

The happy medium between steam and hot water is the vapor-vacuum-pressure system. It is adapted to any type of house. It consumes less coal than either and is distinguished by the accuracy and ease with which it can be controlled. Thus it is equally effective in severe, changeable and mild weather.

Hot water heating requires larger pipes and radiaters than steam. This makes a greater first cost, but assures a comfortable amount of warmth at all times. It operates with little attention, for its whole equipment is very durable. It is eminent for economy in fuel. It will provide for any number of rooms.

WARM AIR SYSTEM IS HYGIENIC

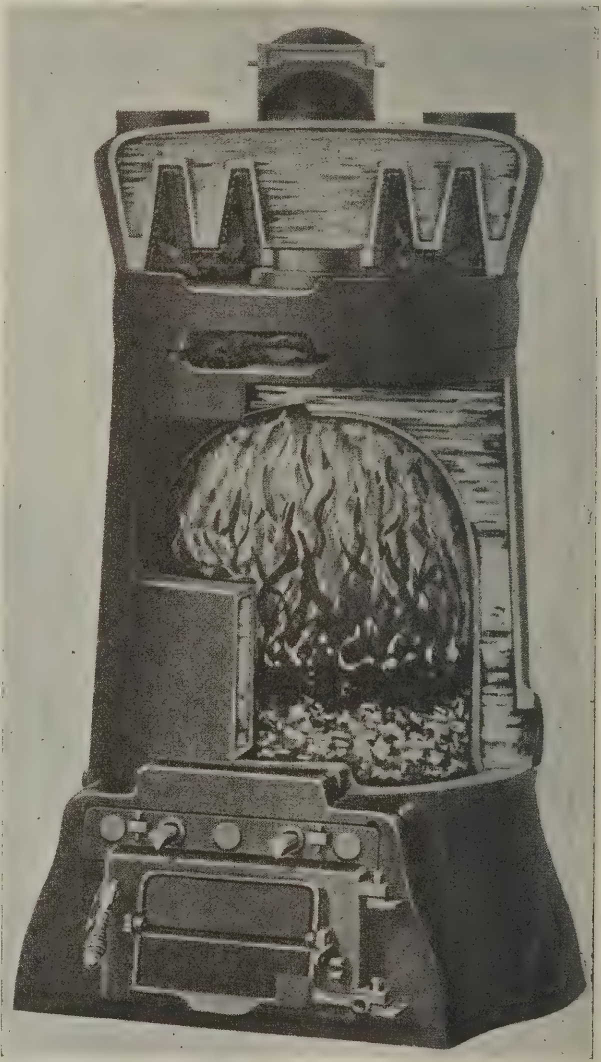
Because warm air heating draws the fresh air continually, day and night, from outside, this form of heating is supreme for hygiene. In a good system, the air is not only renewed all the time, but it is kept in circulation; and modern sanitary science recognizes that circulation is equally important with freshness. It has been demonstrated that air which is quite pure but stagnant is almost as lacking in healthful quality as vitiated air.

The value of constant ventilation has long been recognized in the State regulations that govern schools. It is essential for the health of children to have the conditions at least equally good in the home. The warm air system of heating is perfect for ventilation because it is not only steady, but it is accomplished without drafts and without the chills that ensue from admitting outer air directly through windows or other openings. Another advantage is that the warm air system provides a means for bringing the fresh air into the house in a pure condition.

The air is properly moistened by a humidifier, or waterpan, attached to the heater. The in-doors in winter should be as healthful and as comfortable as the out-doors in summer. Warm air heating assures that.

The warm air system is particularly adapted to the usual house, having complete cellar excavations, so that pipes do not have to carry a long distance. Any size house can be heated, but the unusual size or type may require more than one heater. The extensive system, however, is only proportionately expensive, and still cheaper than any other system to instal.

The warm air system heats a house by means of fresh air drawn continually from outside or from within into a heating system in the lower part of the building. If the system is right, fresh air is drawn strongly into the heating plant, as soon as the furnace begins to function. It is heated quickly and driven up and through the house strongly and quickly; and from the time the furnace is fired to the time when it is allowed to go out, this automatic circulation of air does not stop.



Sectional View of Circular Type Water Boiler

It cannot stop, because it is based on a powerful, positive natural law: that cold air descends and warm air ascends. The value of a warm air heating installation must depend on the completeness with which it enables this natural law to operate.

The fresh air enters the house through the heating plant, which is a heater completely inclosed in an air-tight iron casing or over-coat. The fresh air pours into the space between these two, flows in a rising current and ascends into the house through large pipes. Each pipe ends at a "register"—an opening in the floor or in the wall near the floor covered with ornamental iron grill-work. Hold your hand over such a register, and you will feel a strong, steady flow of warmth.

The circulation of this warmed fresh air does not cease after it emerges from the register. It continues to rise through the house, thus spreading warmth and at the same time keeping the air vitalized by the circulation which is so beneficial for health.

Correct Design Important

The incoming fresh air does not at any time come into direct contact with the fire. Therefore, it is obvious that the design of the furnace is all-important.

What the casual eye sees in every heater is a grate, a fire chamber, a smoke pipe and a group of warm air pipes. But these do not make a heater.

For example, the heated gases from the fire go directly up the chimney. That means that a good proportion of fuel-value is lost. A correct heating design forces the heat to the heating surfaces. This makes the out-going gases circulate around the top of the heater, and they cannot escape into the chimney until all available heat-units have been extracted.

Again, if the various parts of a warm-air system are not scientifically proportioned to each other, the system must fail. Thus, a large grate-surface with a small heating surface means a roaring fire in the fire-chamber, but a feeble supply of warmed air in the house, because the incoming fresh air does not touch enough heated surface.

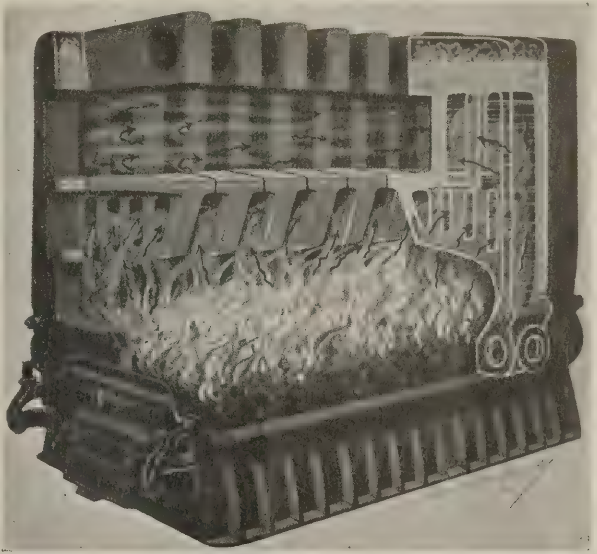
A good warm air system wastes no heat on the cellar. It is *alive* all the time, driving warm air upward like a blower. It will send more heat through the house with a moderate, economical fire than a poor heating system delivers with the biggest fire that can be built in it. It is not the fire, but the amount of delivered warm air that counts.

Maintenance of an economical fire depends on many considerations. Poor grates waste much coal. A good grate must be close-fitting, so that it will not drop its live fuel or its unburned coal. It must work freely, so that ashes shall not remain to choke the red fire. More important than all is an exact proportionate amount of air-passages. If the air-passages are insufficient, the gases will not ignite completely, though coal will be consumed just the same. This loss often runs as high as 23 per cent. with poor grates.

Another important point in heaters is capacity of ash-pits. Ashes that pile up under the grate cause its destruction by "burning out." In small ash-pits the ashes pile up almost continually. Commodious ash-pits eliminate the trouble and make it easy to remove ashes at proper intervals.

Large feed-doors make it easy to feed coal into the fire-chamber. This is more than a mere convenience. A good, evenly laid bed of coals is essential to a live and economical fire. It is practically impossible to feed a fire properly through small feed-doors.

Clean-outs in the tops of the heaters facilitate the cleaning of the radiator system. Patent regulating check dampers control the chimney draft and aid greatly in saving fuel as well as regulating the heat.



Section Showing Interior of Steam or Water Boiler

The warm air heating system with such equipment is the most economical of all the good systems. Its initial cost and its cost of installation are the least. There are few parts to wear out or demand repairs. It is easy to operate. The amount of fire can be adjusted promptly to the temperature, and fuel consumption can be reduced whenever weather happens to moderate. In late spring and early autumn a small temporary wood fire will take the chill from a house for a whole day or the greater part of a day.

The power of a steam boiler, that enables it to drive live steam through long runs of pipe to distant rooms, makes this type of system adaptable to any type of building.

The installation of a steam heating system costs less than a hot water system, largely because the pipes and radiators are smaller and because many of the fittings are more simple. Next to warm air heating, it is the most simple of the four good methods for heating, in installation and operation.

STEAM BOILER IS HEART OF SYSTEM

The boiler is the heart of the steam heating system. If the boiler is ample in power and correctly designed to get maximum heat out of the fuel, the steam heating system responds quickly. It heats the pipes and radiators quickly and thus meets conditions when temperatures fall suddenly. Its pressure can be reduced quickly, and this makes it adaptable to conditions when varying weather demands varying degrees of heat or when heat is required only a part of the time.

The fire in a steam heating plant with the proper boiler can be allowed to "simmer," that is, be kept at a point where it consumes hardly any coal and requires very little attention. It can be kept so indefinitely, and yet at any moment it can be increased to drive steam "full head" through the house.

STEAM PLANT IS RESPONSIVE

This responsiveness of the steam heating plant is one of its qualities that make it satisfactory in the early morning, when warmth is particularly desirable. It can be shut down at bedtime to a point just sufficient to prevent the house from chilling, and before it is time for the inmates to arise it will be sending its heat powerfully through all the rooms.

Another advantage is that it will drive its heat to great distances from the heating plant, making it feasible to place the boiler at any convenient point in the building, or even to heat several houses from one central point, if desired.

Its principle is simplicity itself. The heating plant consists of a heater (fire-chamber and boiler) which heats the water contained in it. When the water has attained a temperature of 212 degrees, steam is formed. It expands into the pipings and radiators throughout the house, and they radiate the excellent warmth thus attained. As the steam parts with its heat, it condenses into hot water and flows from the radiators back through the pipes to the boiler, because water is heavier than vapor and naturally descends. Thus there is continual circulation.

This makes a correctly installed steam system exceedingly easy to manage. Indeed there really is nothing more to do than with a warm air heating plant, for the boiler controls everything, and is the only equipment needing regular attention.

STEAM BOILER REQUIREMENTS

The boiler attends to its part of the work without much assistance. But it must be a good boiler. It must make steam promptly and furnish enough of it. The water passages must be narrow, in order to make quick, vigorous circulation of steam. Wide water passages make feeble circulation. It must be easy to operate. It must be economical, and it must have the quality for long, satisfactory service.

It must have the largest possible amount of active heating surface over the fire, properly proportioned. Deep fire-chambers with corrugated sides, long fire travel for the combustion gases to give up all their heat, high and commodious ash-pits and large feed-doors are standard features of our boilers. Intending purchasers will do well to understand the principle of boiler ratings thoroughly as explained on subsequent pages.

There are other systems of heating that are sometimes used in the small house, namely, the pipeless furnace and the vapor-vacuum-pressure systems. These will be discussed in an early issue of BUILDING AGE.

Lighting the Home

Selection and Arrangement of Adequate Fixtures to Give Correct Quality and Intensity of Light as Well as Attractive Decorative Effect

By M. LUCKIESH

In the previous articles on this subject the living- and dining-rooms were discussed in detail. Some of the principles brought out there apply also to other rooms in the house. In this article, therefore, the lighting of the remaining rooms will be discussed only in so far as it involves special points pertaining to them not mentioned before.

A CEILING fixture in the reception hall is usually most suitable, although an outlet also may be provided for a portable lamp. The fixture may be strictly ornamental if desired. Various types of panelled lanterns, semi-indirect fixtures or even ceiling bowls are satisfactory. In Fig. 1 is shown a small hall with a single unit surrounded by a silk shade.

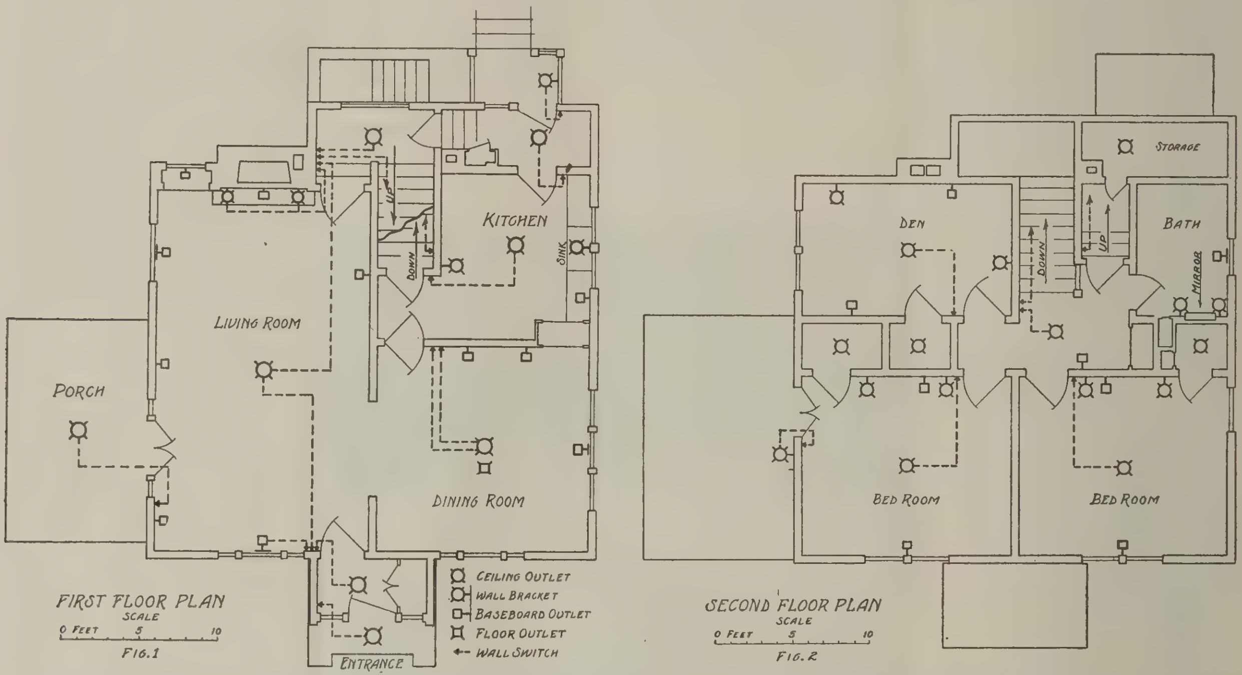
The sun room has some of the characteristics of the living-room, but, of course, is generally smaller. A semi-indirect fixture may be satisfactory for general illumination, but a portable, illustrated in Fig. 2, serves a double purpose admirably. It provides a local illumination for reading purposes and a general illumination for conversational purposes. An ordinary lamp with an open shade will do this fairly satisfactorily with a single circuit, but the lamp shown has two circuits, providing, respectively, upward and downward components.

No problems are offered by the library and den differing from those already discussed. A careful consideration of the arrangement of the furniture will indicate the best positions of the outlets. It is suggested that such rooms be provided with central ceiling fixtures and plenty of outlets for portable lamps.

In the bedroom a wall-bracket about six feet above the floor should be located on each side of the dresser. These brackets may be spaced about five feet apart. A baseboard outlet should be provided for one or two small decorative portables to be placed on the dresser. The latter may also be the solution for lighting the dressing-table, although brackets may be provided if desired. It is always possible to fasten brackets on these articles of furniture. In this case baseboard outlets will suffice. A baseboard outlet should be provided for a small portable near the head of the bed or between the heads of the beds. Besides this an extra baseboard outlet is convenient for an electric heater. The center of the ceiling should be wired with a controlling switch at the doorway. A small semi-indirect unit may be installed if desired, but usually enough general illumination is available from the brackets. It is not good practice to depend alone upon a ceiling fixture in the center or even upon a single drop-cord over the centre of the dresser. If no ceiling fixture is used, a switch should be provided for the brackets unless one of them is handy to the entrance.

A Simple and Economical Fixture for the Porch

The sewing room should be lighted generally to a fairly high intensity by means of a ceiling fixture. An excellent type is the so-called semi-indirect unit with a diffusing bowl. A direct-lighting unit may be satisfactory if hung high. If the reflector is sufficiently concentrating, it will direct a powerful illumination upon the cutting table and upon the sewing machine. A portable floor lamp is a valuable fixture in the sewing room since it may be adjusted to illuminate the work. The Mazda "daylight" lamp has met with considerable satisfaction in the sewing room owing to the fact that it reveals colors more nearly in their true values.



The Provision of Adequate Outlets Is Essential to Good Lighting. The Arrangement for the First and Second Floor Shown Above Is Not Extravagant in This Respect

A lighting unit should be placed above each landing on the stairways. The usual three-way controls are essential for convenience and the fixtures for the purpose are generally simple ceiling bowls or similar fixtures.

The problem in the bathroom is to provide suitable fixtures at the mirror. This should not be difficult, but a large percentage of bathrooms are not intelligently lighted. There should be a fixture on each side of the mirror to light up each side of the face. The height of these fixtures should be about five feet to avoid shadows. Simple fixtures with small diffusing shades are satisfactory or even simple sockets and opal or frosted lamps. The light-sources at the sides of the face are in the extreme edge of the field of vision, but there is no sacrificing of the illumination of the face. The single lighting unit above the mirror cannot be too strongly condemned. A baseboard outlet also should be provided for an electric heater or other electric apparatus.

One of the common mistakes in lighting the kitchen is the combination fixture in the centre of the ceiling. To keep the gas flame or mantle far enough from the ceiling this fixture must extend down at least two or three feet, bringing the electric lamp so low that the housewife is always working in her own shadow. If a gas fixture is necessary to insure against the possible failure of electric service place it on the wall out of the way. The central electric fixture should then be a prismatic or an opal reflector at the ceiling. A 75-watt Mazda white glass lamp or bowl frosted daylight lamp may be used.

Brackets over the sink and near the stove are also convenient light-sources. A wall receptacle should be provided at a convenient location for use with electrical appliances.

Most vestibules are provided with ceiling fixtures. These may be simple and controlled by switches in the nearest room. The outside fixtures should be placed at the side of the door if the appearance will permit. When placed this way they reveal the features of a caller more clearly than when hung directly overhead. A lantern on a bracket usually solves the problem. It is also desirable to place the house number where the lighting fixture at the front entrance illuminates it.

For the porch the best fixture is a tightly enclosed ceiling-bowl or ball. This prismatic type is efficient in directing the light downward, and if tightly enclosed, dust and insects are kept out.

A number of light sources can used in the basement to advantage. The stairway and landing lights should be controlled by a three-way switch. Simple opal glass reflectors are satisfactory for the basement lamps, and these may be supported by fittings on the ceiling.

A light-source should be available in front of the furance or boiler, one in the fuel bin, and one in the lavatory.

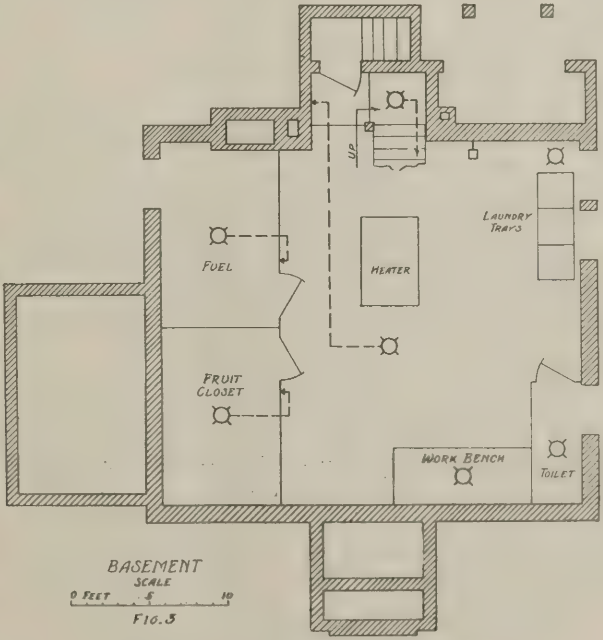
A light-source should be placed in the fruit closet with an indicating switch outside. A large lamp, preferably a 75 or 100-watt Mazda "daylight" should be placed above the laundry trays at the left. This will eliminate annoying shadows. A wall-receptacle should be always available in the laundry for connecting electrical apparatus, and a lamp above the workbench will be appreciated.

The aim of these articles has been to point out the possibilities of lighting and some of the fundamental principles of lighting effects. Finishes and designs are available to suit any decorative scheme, but it should be noted that a consideration of these features alone does not reveal the lighting effect afforded by a given fixture. The generally poor interior lighting today is due largely to the failure of the fixture-dealer and the consumer to realize that the fixture is only a means to an end and that the end is lighting effect.

A large variety of lamps are on the market. For the home all-frosted and bowl-frosted lamps are usually more satisfactory than clear lamps. Such lamps come in many shapes and sizes and record should be made of the voltage, wattage and shape of lamp which is most satisfactory in the various fixtures. Information as to sizes of lamps cannot be given in simple form because the required lamp will vary so much with the fixture, the surroundings, and

Reception Hall Illuminated by a Single Unit Enclosed in a Silk Shade

Sun Parlor, Showing a Portable That Looks Well and Gives Satisfactory Light



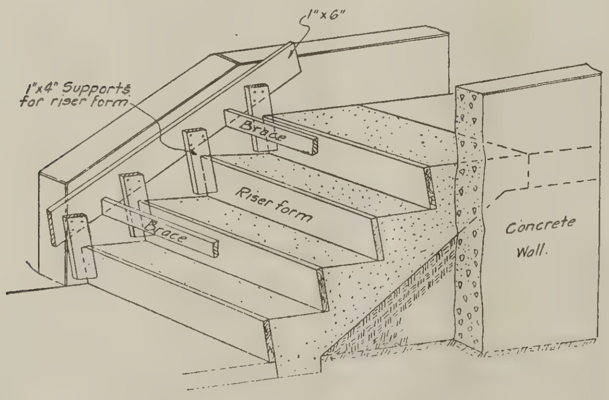
Arrangement of Outlets in Basement

the conditions of usage. The Mazda daylight lamp has several places in the home, such as the kitchen and sewing room. Many with sensitive eyes seem to find this "daylight" quality of light best for reading. A Mazda white glass lamp makes it possible to use the more efficient Mazda "C" lamps in the home. Where there are shadows of fixture chains and other parts the use of these diffusing lamps and frosted lamps will reduce them materially. A tinted lamp simulating the candle-flame in color has been put on the market in response to a demand for an electric fixture which presents the charming warmth of color of the old-fashioned candle.

Charming glassware in tints and painted designs is available for all rooms. In the bed-chamber and the nursery some of these painted designs are very appropriate. Fixtures should shield the lamps from the eyes, and the diffusing media, whether glass or textile, should be dense enough to avoid glare. No fixture can be beautiful and no lighting effect can be artistic if glare is present. The problem of light combined interior decoration with certain scientific principles of quality, intensity, etc. It should not be left to chance, but shown by worked out by one who knows.

Concrete Steps Easy to Build

DETAILS of form construction for simple concrete steps such as might be used at the side or rear entrance of the average home are shown in an accompanying drawing. Steps of this kind, resting on well compacted earth, require no reinforcing. Forms consist of planks held firmly in place by means of 1 by 4-inch cross pieces against the side walls, which are built first. To the planks are nailed short 1 by 4s, the length of which is such that they come within two inches of the treads. An added advantage in riser construction is given by sloping these pieces back, thus making an attractive looking step which provides a safety factor not present in most types. Cross planks, usually of one-inch material and eight inches high, are nailed to these to make the riser forms.



Simple Design Which Can Be Adapted to Any Number of Concrete Steps

Concrete Steps Add to the Attractiveness of the Entrance as Well as to the Safety and Permanence

For steps of this kind it is best to use concrete mixed in the proportion of one sack of Portland cement to 2 cubic feet of sand and 4 cubic feet of pebbles or crushed stone. Forms may be removed as soon as the concrete has acquired sufficient strength to be self-sustaining. The steps may be given a finished surface by using a steel trowel after any small depressions which might be found have been filled with a cement grout.—*The Concrete Builder.*

Common Sense in Plumbing

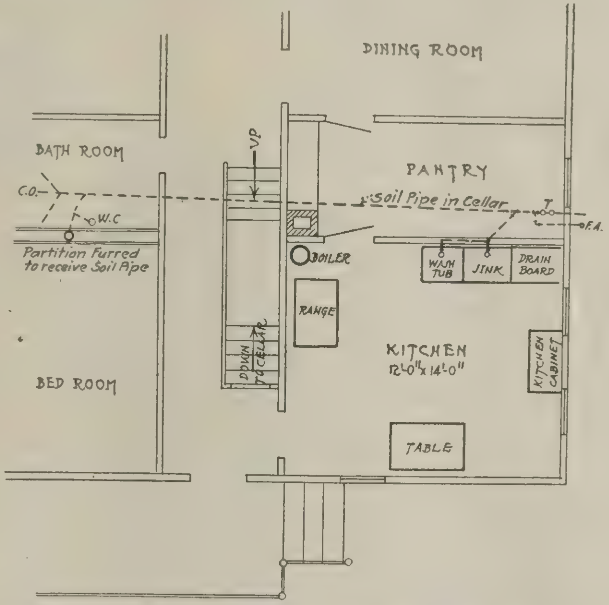
Location of Range and Plumbing Fixtures Should Be Made with Consideration for Comfort and Convenience of the User

By William Hutton

THE kitchen is the workshop of the home. And just as industrial workshops are planned with care and due regard to the efficiency of the workers, so should the kitchen be. Local conditions and structural limitations of necessity determine the location of the kitchen in the building, but it is seldom that foresight cannot secure at least a modification of any disadvantage that the location may entail.

In too many kitchens it is found that the range and plumbing fixtures are not advantageously placed. The cook has to "cover too much ground" in getting meals ready or in washing up dishes. A chart of her footprints showing the unnecessary motions and distance traveled each day would astonish the factory efficiency engineer and the health faddist who claims that women do not walk enough.

The architect, builder and plumber can improve this condition, and what is more, they can very often save money at the same time for the owner.



Plan—Well Arranged Kitchen and Plumbing for Small Bungalow

Take the matter of placing the range, for instance. How often is it planned to set the range so that it will be well-lighted, convenient to the kitchen sink and yet not so close to it that the cook will be uncomfortable when preparing food there or in washing the dishes? Is it not more often found that the architect has tried to place his chimney where it would accommodate a flue from a heater or from an open fireplace as well as the flue from the range? Or is not the outside appearance of the building considered too much when the matter of placing the kitchen chimney is taken up? And, of course, the range is set wherever it can be conveniently connected to the chimney.

There also is the matter of placing the kitchen sink. In front of a window is not a good position. In the first place, the pipes are unnecessarily exposed to freezing. In the second, the housewife is compelled to stand facing a strong light. It is just as important that the light be thrown on the work from the side when the work is in the sink as when it is on a desk.

The arguments advanced for proper planning are illustrated in the accompanying plan of a bungalow recently erected. Although the plan adopted is not that originally drawn, the owner readily consented to changes when the increased efficiency of his kitchen was made apparent to him. And as the change was made at a saving of several dollars in plumbing work, his pleasure was in no way decreased.

The arrangement illustrated saves a good deal of walking when baking or other cooking operations are being performed at the cabinet, and the distance from the stove is not great either. The light comes from the side both to the range and to the sink and wash tray. The fixtures are set against an inside wall so that the water pipes coming to them are located where they are not likely to freeze. And as the soil pipe running to the bathroom passes almost under the fixtures the waste connection is also simplified and it is easy to connect vent pipes to the traps with a minimum of piping. Fig. 2 shows the waste and vent piping and how few fittings are required to make the two connections.

If the sink and wash trays had been set along an outside wall as is commonly done, the water pipe would of necessity pass close to the cellar wall-head, subject to cold drafts passing between the foot plate and the wall and the waste piping would have been longer and more difficult to install. As a matter of fact, the difference in cost of installation would have amounted to about $5.00 more, the work would have been less satisfactory and the housewife would have had less comfort in the use of her kitchen.

It may be well to draw attention to the matter of venting a combination like this. Where plumbing laws do not compel a system of venting this feature generally is omitted, sometimes with detriment to the job. Also, the two fixtures might have been carried through one trap, either of the pot or round pipe style.

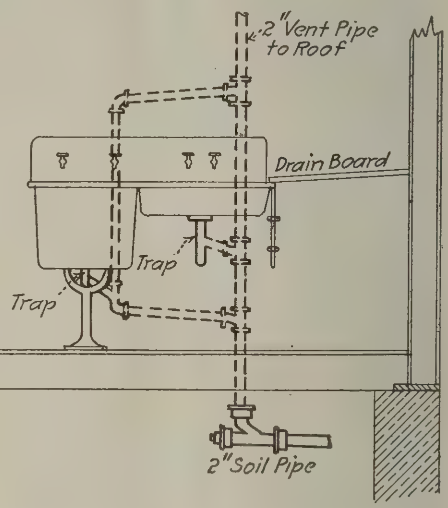
But here is the objection. Perhaps it will be realized that the saving in first cost is too small to compensate for the disadvantages it entails. The discharge from a kitchen sink is harder to carry out into the sewer without fouling the interior surface of the house drain than that from any other fixture. The grease carried out with the water cools in the pipe and adheres to the walls, if a constant current of air is passing through the pipe this grease is dissolved to some extent by the oxidizing properties of the air. If no current of air is passing through the grease builds up and eventually stops the passage. Also, a detrimental effect on the metal is experienced.

VENTING SHOULD NOT BE OMITTED

Anti-siphon traps may be placed so that the action of a discharge from the bathroom or other fixtures will not unseal the traps, and so the venting may be omitted so far as safety from entrance of sewer air is concerned. The ventilation itself, however, is the valuable feature of construction which makes it worth while carrying out, and unless the cost is considered prohibitive it should be installed whether plumbing laws are in force or otherwise.

Another thing that does not always receive proper consideration is the location of the kitchen range boiler. If it is too close to the water front in the range the connection is "stiff" and leaks soon develop in the piping and fittings. It it is too long the efficiency of the circulation is lowered. If it is placed in a closet in order to save wall space in the kitchen, the difficulty in making the connections is increased and also that of drawing off the water so that periodical flushing, which is of the utmost importance if the boiler is to have a normal life, is neglected until sediment has collected and noises in the system give warning that the circulating pipes are choked.

If, as in the job illustrated, the boiler is placed against the chimney, then this should be known when the chimney is built so that the tile thimble may be built in at a point high enough to allow the plumber to carry his pipes to the top of the boiler without interfering with the smoke pipe connection. And when a valve or stop is fitted, it is well to use one of the compression variety so that the owner may be able to shut it in case of emergency. Those of the ground key type turn very hard when they have been in service a few years and so seldom operated as they are on the average kitchen boiler supply.

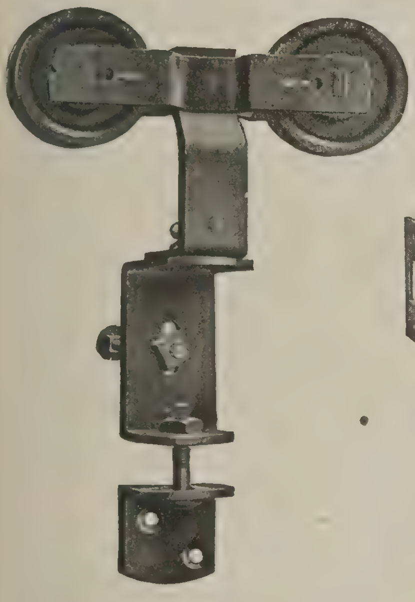


Combination Sink and Laundry Tray
Showing connections to waste pipe and continuous vents from fixture traps

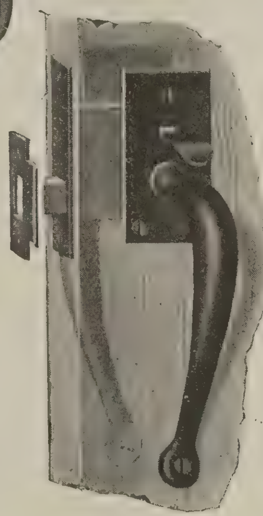
In some localities it is the custom to install all of the water piping so that the control valves for the various fixtures are placed on a board in the basement and labelled so that any supply line may be found and the water turned off or on with the minimum delay. This is a good idea if there is no objection to the cost entailed. A central location is of course selected, and very often it is near the bottom of the cellar stair. The same type of stops should be used in each case, and if these stops are expected to drain the water back from the lines it is an easy matter to connect up the waste outlets to a small pipe which will carry the water to any point in the cellar and save wetting down the whole floor.

NATIONAL

GARAGE DOOR SET



The Hanger operates on a swivel and turns on the track without sticking or binding in any way.



The No. 27 Latch has no complicated parts to get out of order.

Makes Friends on its Quality

Keeps them on its performance

Garage doors equipped with the National sets, Nos. 805 or 806, assure an easy-working, sliding and swinging construction at all times.

Doors fitted with National sets are absolutely weather-tight. Snow and ice cannot interfere with their operation. If the floor rises or swells, doors are adjustable.

Write for booklet, "National Garage Hardware," and mention dealer's name.

National Mfg. Company

Sterling, Ill.

: New Catalogs and Publications :

These catalogs may be secured direct from the manufactuer. If you prefer, write the date of this issue and the numbers of any catalogs on a postal and mail it to "Building Age," 912-920 Broadway, New York City, The catalogs will be sent you without charge or obligation.

462. Majestic Electric Heaters. Majestic Electric Development Company, Philadelphia, Pa.—Illustrated pamphlet describing the operation and construction of the complete line of electric heaters manufactured by this company.

463. Southern Pine Manual of Standard Wood Construction. Southern Pine Association, New Orleans, La.—The 8th edition of this manual, which covers much valuable data in relation to yellow pine as a structural material, has recently been isued at a price of $1.00. This manual bears the same relation to yellow pine as the Cambria Handbook does to steel.

464. Storage of Sacked Cement. Portland Cement Association, Chicago, Ill.—Booklet illustrating and describing the proper methods of storing sacked cement. The advantages of storing cement are given.

465 The TEC Truck. A New Factor in Transportation. Terminal Engineering Company, New York City. —Illustrated leaflet R-229 describes the operation and construction of the TEC truck and points out the advantages possessed by it. This truck is designed to handle the problem of short haul transportation, and is a combined outdoor and indoor machine, permitting the haulage of goods from any floor of any building to any floor of any other building within reasonable distance. Loads are carried on separate platforms, eliminating loading and unloading delays.

466. Terra Cotta Defined. National Terra Cotta Society, New York City.—Volume VI. of the brochure series issued by this society is handsomely and profusely illustrated with various structures in which terra cotta is used. The text points out the advantages of terra cotta as an available building material with which to clothe or trim a permanent building, and gives the various applications to which it can be put. The history and process of manufacture of terra cotta are described in detail.

467. "Richmond" Magazine Feed Down Draft Smokeless Boiler. Richmond Radiator Company, New York City.—Illustrated book describing the construction and operation of this boiler for steam, vapor, vacuum and hot water heating, for hard and soft coal and coke, to be used for residences, cottages, apartments, hotels, churches, schools, theatres, stores and private and public buildings of all sizes. Illustrations show structures in which these boilers can be found. Several testimonial letters are given.

468. Modernize Your Farm. Kewanee Private Utilities Company, Kewanee, Ill.—Bulletin A very thoroughly illustrates and describes the various models, types and sizes of the Kewanee water supply systems, Kewanee electric lighting plants, Kewanee combination water supply and electric lighting plants and Kewanee sewage disposal systems for use on the farm. Several buildings equipped with Kewanee systems are shown, among which can be found farms, schools, country clubs, country estates and institutions.

469. Porete for Roof-Decks. Porete Mfg. Company, Newark, N. J.—Illustrated circular describing this porous concrete, which is used very satisfactorily for large and small roofs. The advantages of Porete roof-decks are given, as are also specifications and sketches showing method of application. Prices and samples furnished on request.

470. The Brascolite. The Ideal Light for Every Purpose. Luminous Unit Company, St. Louis, Mo.—Catalog No. 8 fully describes and illustrates the various types of lighting fixtures manufactured by this company. Contains valuable engineering data on the subject of lighting. Prices are given.

471. Business Floors. Armstrong Cork Company, Linoleum Dept., Lancaster, Pa.—Attractively illustrated book showing the suitability of Armstrong's linoleum for floors of public and business buildings. The advantages of linoleum for business floors are fully discussed, and the illustrations show places where it is actually in use. Colorplates of a number of patterns particularly appropriate for various types of floors are also shown, and specifications and directions for laying out are included.

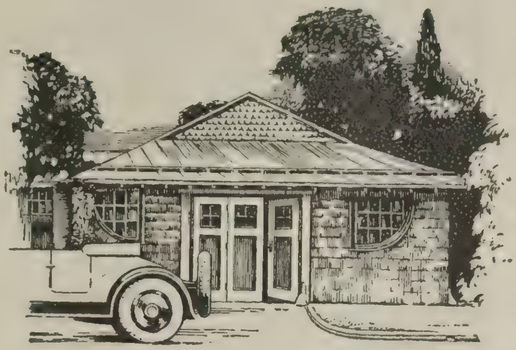
472. How the Ingersoll-Rand Company Is Solving Its Housing Problem with Concrete. Portland Cement Association, Chicago, Ill.—Illustrated booklet issued by this association, describing in an interesting manner the housing development conducted by the Ingersoll-Rand Company to provide accommodations for its workmen. The construction and financing of the concrete houses built are fully described.

473. Zapon Lacquers and Lacquer Enamels. The Celluloid Zapon Company, New York City.—Illustrated catalog describing the product of this company, which is applicable to all metal or wood surfaces and is claimed to be absoluately waterproof. These lacquers and lacquer enamels are suplied in all colors and can be applied either by brushing, dipping or spraying.

474. Solid Asphalt Shingles. Fibrated Products Corporation, Chicago, Ill.—Attractive booklet containing samples showing the solid asphalt shingles manufactured by this concern, to which the trade-mark Fibre-Strong has been given. These shingles are made in two styles, tapered and standard, and in three colors, tile red, moss green and slate grey.

475. Economy in Building. MacAdams & Call, Chicago, Ill.—Illustrated booklet describing E-Cod Fabric, which consists of a heavy felt paper saturated in tar and reinforced with galvanized wire for serviee as a plastering base. Specifications for both interior and exterior plastering and curtain walls are given.

476. Von Duprin Self-Releasing Fire Exit Latches. Vonnegut Hardware Company, Indianapolis, Ind.—48-page attractive booklet thoroughly illustrating and describing these self-releasing fire exit latches, which



Complete Garage Sets

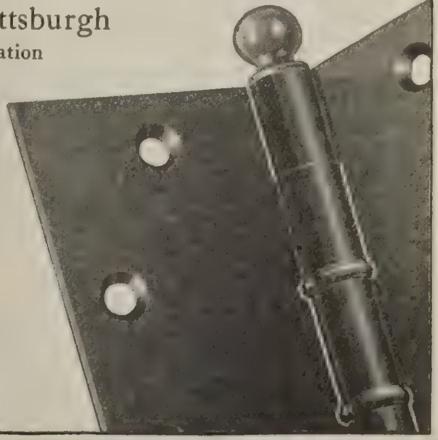
COMPLETE hardware door sets for garages of all sizes, shapes and designs are among the recent developments of the McKinney Manufacturing Company. Garage doors hung with these sets are easy to operate, offer greater protection and assure an entrance that adds dignity and charm to the whole structure.

These garage sets have a remarkably wide range of usefulness embracing the swinging, sliding-folding and "around the corner" types of doors. Doors hung with the sliding-folding set fold smoothly out of the way into the garage. "Around the corner" hung doors, used where space is comparatively limited, slide along the inside wall. McKinney hung doors close weathertight — without sagging or sticking. All these sets, including drawings and directions, are packed complete in wooden boxes.

McKinney Garage Sets have been given the same careful attention that is responsible for the worth and work of McKinney Hinges and Butts. The McKinney Manufacturing Co. has been identified with the development of builders' hardware for fifty years.

McKinney hung garage doors are pictured and explained in book form. In this book you will see how easily these sets are installed and how their use makes better looking, stronger and more protective doors possible. This illustrated book is particularly valuable to Architects and Builders. It points a way toward simplified construction and lower building costs. This book, with other literature including the McKinney general catalog, will be forwarded to any Architect or Builder upon request.

McKINNEY MANUFACTURING CO., Pittsburgh
Western Office, State-Lake Bldg., Chicago. Export Representation



McKINNEY
Hinges and Butts

Also manufacturers of McKinney garage and farm building door hardware, furniture hardware and McKinney One-Man Trucks

are applicable to all types of doors wherever people congregate and quick exit may be necessary. This booklet also describes the Von Duprin automatic locking operator and adjustor for casement windows.

477. Blue Print Machinery and Drafting Room Supplies. C. F. Pease Company, Chicago, Ill.— Catalog B covers in a complete manner drafting room equipment and supplies of all kinds. This illustrated catalog is also accompanied by descriptive bulletins, Nos. 4100, 4102, 4103 and 4104. These include everything from blueprint machinery, drawing tables, drawing instruments, ink, plan filing cabinets to surveying instruments. Of particular interest is the Pease vertical plan-safe, in which drawing can be filed vertically.

478. The Roof Everlasting. Mohawk Asbestos Slate Company, Inc., Utica, N. Y.—Illustrated booklet describing a product being marketed by this company, called "Mohawk Tapered Asbestos Slate." This is an asbestos shingle or slate tapered like a wood shingle and is made in various colors to give any desired roof effect.

479. The O'Brien Woven Lath. O'Brien Woven Lath Company, Chicago, Ill.—Illustrated 12-page pamphlet describing in an interesting manner how woven wood as a base for plaster and stucco has been developed by this company and pointing out its advantages and economies.

480. A Collection of Successful Designs. The Kawneer Company, Niles, Mich.—Booklet presenting by means of drawings and photographs the different styles of store front suitable to different lines of business that have proved most successful. These include jewelry stores, women's wear stores, men's wear stores, banks, restaurants, shoe stores, and practically every type of business that one can think of.

481. Windustite. American Metal Weather Strip Company, Grand Rapids, Mich.—8-page folder in the form of blue prints, showing the application of this company's weather strips to various and sundry types of windows, including pulley windows, casement windows and French doors, metal windows, austral windows, door thresholds, etc. These details show both the method of application and operation.

482. Kent Stationary Kleaner. The Kent Vacuum Cleaner Company, Inc., Rome, N. Y.—Illustrated booklet describing the Kent Stationary Kleaner, which is a small, compact machine for location in the basement. It is operated by electric motor controlled by push-button switches near the various outlets for cleaner hose attachments.

483. Kewanee Coal Chute. Kewanee Mfg. Company, Kewanee, Ill.—Illustrated folder describing the operation and construction of this all steel coal chute, which is easy to install and automatic in action. These coal chutes can be well adapted to large or small homes, apartment houses, office buildings, institutions, hospitals, schools or churches.

484. Magnolia Slag Cement. Southern Cement Company, Birmingham, Ala.—Booklet illustrating and describing the Magnolia non-staining white cement manufactured by this company. This cement has been used extensively in the laying of marble, limestone, terra cotta, etc., because of its non-staining qualities. Many views of buildings in which Magnolia cement has been used are shown. This booklet also contains reports on this material made by testing laboratories, etc.

485. Bulletins. Cement-Gun Company, Inc., Cornwells, Pa.—Interesting folder containing bulletins issued by this company on cement-gun construction. These bulletins include reports showing results of tests made on Gunite slabs, together with working tables and safe load tables. Information about the use of the cement-gun for general concrete work and for plastering and stucco work is given. There is also a bulletin describing the use of this machine for waterproofing, etc.

486. The Perkins Universal Draw Cut Trimmer. Perkins & Company, Grand Rapids, Mich.—Illustrated folder describing the many applications of this trimmer to all sorts of work. It is adjustable to any angle desired and is a great time and labor saver.

487. The American Universal Floor Surfacer. American Floor Surfacing Machine Company, Toledo, Ohio.—Illustrated pamphlet telling of the great saving which can be effected by the use of this machine in the finishing of floors, both new and old. The machine is light, compact, ball-bearing, easy to operate and easily controlled.

488. Old European Slate Roofs. Knickerbocker Slate Corporation, New York City.—Attractive booklet describing the advantages and beauty of slate roofs. The various color schemes that can be obtained are given. Photographs of buildings on which slate roofs can be found are shown.

489. American - Larson Suction Ventilators. The American Ventilating Company, Pittsburgh, Pa.—Complete catalog illustrating and describing these ventilators. This catalog gives detailed data regarding the construction and sizes of the ventilators and also contains numerous photographs showing their actual application to all types of buildings. The line also includes chimney cowls for use on chimneys which do not draw properly.

490. Murphy Door Beds. Murphy Door Bed Company, Chicago, Ill.—Interesting folder showing the use of Murphy In-A-Dor Beds by actual photographs of installation. Plans showing how this bed saves space and also showing its detailed operation accompany this folder.

491. The Improved Schlueter Floor Surfacing Machines. M. L. Schlueter, Chicago, Ill.—Illustrated pamphlet describing the operation and construction of these floor surfacing machines, which are rapid, automatic, ball-bearing and electric. These machines may be used to surface old floors as well as new. A little leaflet containing several testimonial letters accompanies this pamphlet.

492. Capitol Boilers and United States Radiators. U. S. Radiator Corporation, Detroit, Mich.—The complete line catalog describes and illustrates the construction and operation of the boilers and radiators manufactured by this concern. This catalog contains reference matter and engineering data of interest to the designer of heating systems.

493. National Pipe for Drilling Purposes. National Tube Company, Pittsburgh, Pa.—Illustrated bulletin No. 15-C describes the origin of drilling and also discusses in a very thorough manner the modern drilling methods. The advantages of "National" pipe for drilling purposes are enumerated.

Barrett Everlastic Roofings

Give Your Customers Maximum Roofing Value

BY recommending Barrett Everlastic Roofings to customers you assure them of the maximum in roofing value.

The unusual durability of Everlastic Roofings is ample evidence that only the highest grade materials go into their manufacture.

Their low price is certainly of considerable importance to building owners in these money-tight days. And the fact that they are extremely easy to lay effects a real saving in labor costs.

In addition, Barrett Everlastic Roofings are highly fire-resistant, and wind- and weather-proof. The "Rubber" Roofing, in rolls, will give unequalled service on factory and farm buildings. The slate-surfaced styles, in roll or shingle form, are of a beauty that lends a note of distinction to any home, however little, however big.

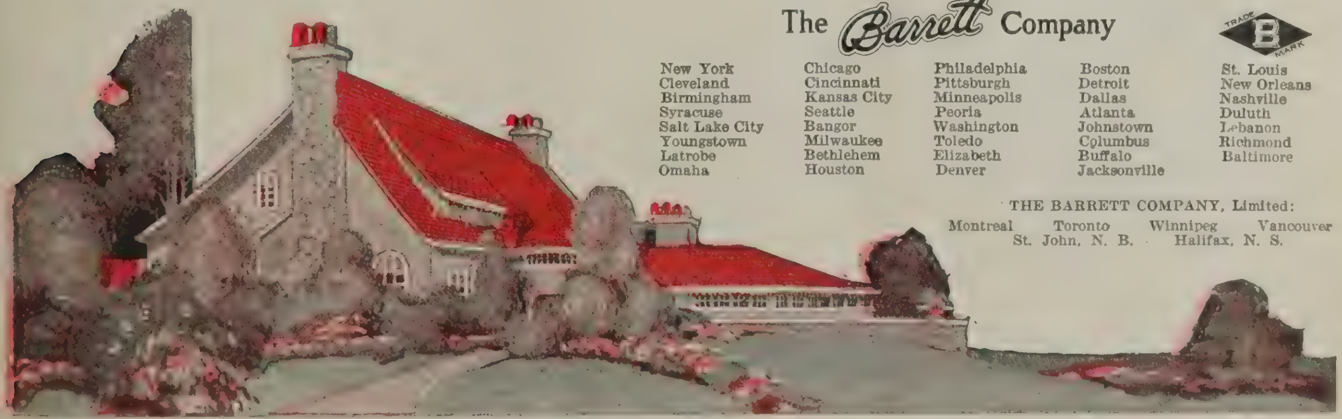
All these Everlastic qualities, backed by The Barrett Company's 60-year-old reputation for dependability, are being powerfully and consistently advertised to building owners in our great Nation-wide Campaign. The already big demand for these maximum-value roofings is constantly increasing. Are you getting your share of the profits?

Everlastic Multi-Shingles. The newest thing in roofing—*four shingles in one.* Tough, elastic, durable. Made of highgrade waterproofing materials and surfaced with crushed slate in art-shades of red or green. When laid they look like individual shingles and make a roof worthy of the finest buildings. Weather and fire-resisting. Need no painting.

Everlastic Single Shingles. Same material and art-finish (red or green) as the Multi-Shingles, but made in individual shingles; size 8 x 12¾ inches. A finished roof of Everlastic Single Shingles is far more beautiful than an ordinary shingle roof and, in addition, costs less per year of service.

Everlastic Slate-Surfaced Roofing. The most beautiful and enduring roll roofing made. Surfaced with crushed slate in art-shades of red or green. Very durable; requires no painting. Nails and cement in each roll.

Everlastic "Rubber" Roofing. This is one of our most popular roofings. Thousands of buildings all over the country are protected from wind and weather by Everlastic "Rubber" Roofing. It is tough, pliable, elastic, durable and very low in price. It is easy to lay; no skilled labor required. Nails and cement included in each roll.



The Barrett Company

TRADE B MARK

New York
Cleveland
Birmingham
Syracuse
Salt Lake City
Youngstown
Latrobe
Omaha

Chicago
Cincinnati
Kansas City
Seattle
Bangor
Milwaukee
Bethlehem
Houston

Philadelphia
Pittsburgh
Minneapolis
Peoria
Washington
Toledo
Elizabeth
Denver

Boston
Detroit
Dallas
Atlanta
Johnstown
Columbus
Buffalo
Jacksonville

St. Louis
New Orleans
Nashville
Duluth
Lebanon
Richmond
Baltimore

THE BARRETT COMPANY, Limited:
Montreal Toronto Winnipeg Vancouver
St. John, N. B. Halifax, N. S.

Building Material Market Review

Prices Showing Signs of Stiffening Due to Increased Activity. Conditions Favorable for Home Building. Period of Depression Passing

THE unmistakable revival of building construction during the last half of March has had the effect of strengthening the building material market all along the line. Prices, as a general rule, are still on a very low level, as compared with those of last spring, but a survey of the situation at this time reveals the fact that the basic building materials, such as lumber, cement and brick, are on a firmer basis than they have been in several months. This applies chiefly to the manufacturers' and wholesalers' quotations, and in some materials the producers have actually issued guarantees, such as in the case of sanitary tile, that prices will not be reduced further. Structural steel and sand and gravel seem to be the only items which are still showing any weakness, but even in these materials the market is by no means panicky.

Taking the building material market as a whole, only a comparatively few price changes downward may be looked for during the remainder of this year, and the reductions that may come will only be the natural price readjustments in the few materials or grades of materials that have been held up to too high a level in the face of the general economic trend. The movement to get back to normalcy has been rather rapid and during the process many industries have suffered, and none, hardly, more than the building material industry. Lumber, for instance, which was the last commodity to reach the peak last year, was the first to return to normal, and as a general proposition the lumber market today may be regarded as having reached that point. The leading construction woods, yellow pine, North Caroline pine, spruce and Douglas fir, were the first to drop, and they have been wholesaling at considerably less than actual cost of production for several months. The better grades have dropped down more in line with producing costs now and during the past three weeks hardwoods have declined very materially. Maple flooring, for example, is now being sold at prices that builders can afford to pay. Spruce and yellow pine lath are on a reasonable level now and are holding firm. Shingles, both wooden and composition, are showing more stability. Common grades of lumber used mostly in small house construction are selling very cheaply, but the market is strengthening and roofers have actually advanced in price during the past ten days. Yellow pine and fir flooring are also on a low price level, but there has been no further decline since the middle of March.

Both common and face brick are firmer in price, and the producers feel confident there will be an actual shortage of brick before the end of 1921. Paints, varnishes, linseed oil and turpentine are becoming steadier as Spring building opens up and there is little likelihood that the market on these products will go any lower before next winter. Window and plate glass products are feeling the effects of the building revival; the demand is increasing and the price holding steady with indications of advance within sixty days.

Portland cement has, to all appearances, struck bottom, and if the movement of this product continues to increase during the next few weeks as it has increased since the first of the year higher prices may be expected. In fact cement manufacturers frankly state that as soon as the highway projects planned for this year are begun there will be a shortage of cement for the building industry. In the New York Metropolitan District alone cement shipments from mills increased from 20,000 barrels a day in the first half of January to $40,000 barrels a day for the first fifteen days of March.

That there has been a marked change in the situation generally is shown by the steady increase in the demand for all materials that enter into small house or housing construction. Commercial and industrial building is not so pronounced, as far as new projects are concerned, although there are millions of dollars' worth of industrial construction still under way, which is now being finished up after long delay due to labor troubles and lack of materials last year. The demand at the present time for lumber, brick, cement, lime, tile, glass, paints and plaster is stronger than at any time since the downward trend began last March.

TAKING the situation as a whole, conditions are ideal right now for the home builder, for aside from the improvement in labor conditions and the low costs of materials, it is easier and cheaper to get mortgage money today to finance small house construction; weather conditions are ideal for both producing building materials and for building activitiy and transportation conditions are excellent. Where it was impossible last March to count on anything like definite delivery of material, today there are plenty of railroad cars available for immediate use and prompt shipments may be relied upon, which means that when a new building is started it will be finished in schedule time. The railroads right now are working out plans for reducing their operating expenses in order that they may subsequently reduce freight rates, but it will be some months before this will be felt by the ultimate consumer.

Freight rate reductions, if they are made, however, will not materially affect the delivered price of building materials, for by that time the reduction in freight charges will be more than offset by the increase in the price of materials at the mills. And the mills must receive more money for their products if they intend to remain in business.

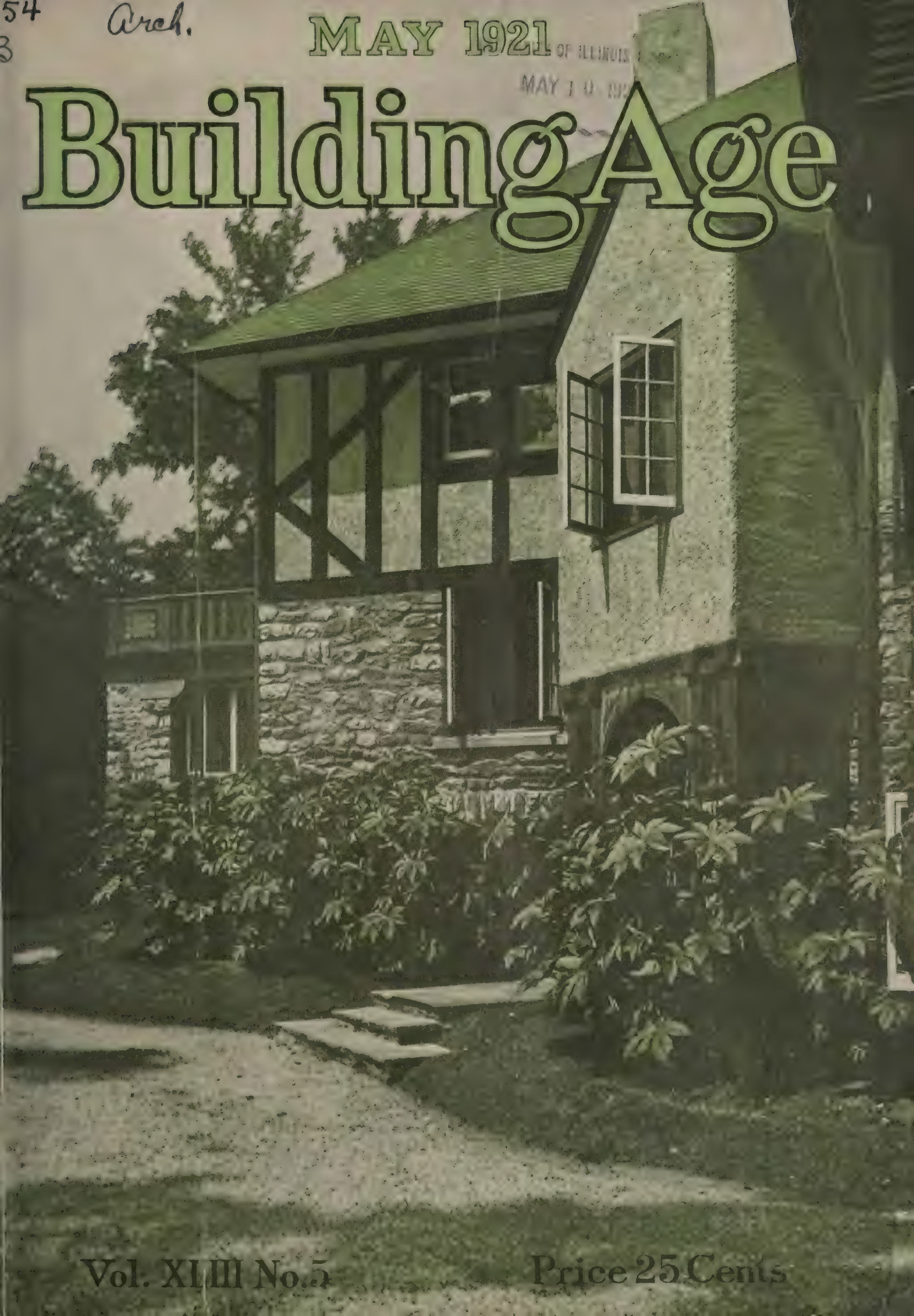
The period of business depression is slowly passing in the East. On the West Coast, also, there are signs of improvement. In the South, particularly the Southwest, business is still very inactive, but a change for the better is close at hand. In the Middle West, especially that territory tributary to St. Louis and Chicago, housing construction is well under way and in the rural districts the building material dealers are doing a good business. Throughout the country the retail dealers during the past month have cut their selling prices to rock bottom, realizing that they make their profit on the replacement value, and the sooner they get rid of high-priced stocks the better it will be for them. This movement has in a measure restored public confidence, a factor most desirable in any industry, and as this confidence grows building activity will increase throughout the remainder of 1921.

54 Arch.
3

MAY 1921

OF ILLINOIS
MAY 1 0 192

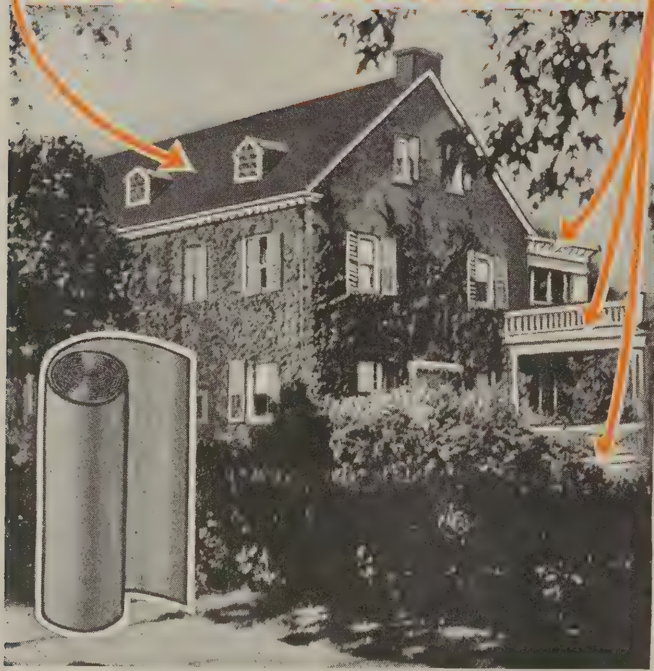
Building Age



Vol. XLIII No. 5

Price 25 Cents

CON-SER-TEX
FOR
ROOFS AND PORCH FLOORS



FOR sun parlors, sleeping balconies, and all flat surfaces, it is ideal. Chemically treated so that it will not crack, stretch, shrink, curl or peel. The burning sun, and warm rotting summer rains will not affect it.

Con-ser-tex is a business-getter, used where more expensive materials are not wanted. It stands up well under severe use, and looks attractive. Recommended by responsible builders and contractors in all parts of the United States.

It is well worth your while to write for our illustrated booklet, "Roofing Facts and Figures," and for samples.

WM. L. BARREL CO.
50 Leonard Street, New York City

Chicago Distributors:
Geo. B. Carpenter & Co.
430-440 North Wells St.

California Distributors:
Waterhouse-Wilcox Co.
San Francisco and Los Angeles

FLOORS
The Wood-Mosaic Kind

For every home—Old or New. Can be installed by your mechanics. Our 5/16" flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood Carpet, strips Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalogue in natural wood colors.

Wood-Mosaic Company
New Albany, Indiana

M&F
TRADE MARK
Fiberlic

Fiberlic Wall Board

The *material* from which it is made, the fact that the pulp is *chemically cleansed* and that the *fibre lengths* give the finished product that *natural reinforcement* that is lacking in ground wood boards, is in itself a guarantee of the superiority of Fiberlic for *strong, permanent, economical* and *sanitary construction.*

MacAndrews & Forbes Company
200 Fifth Avenue, New York City
Factory: Camden, N. J.

BUILDING AGE

New York, May, 1921

Modern Electrical Homes

THERE was a time when houses and apartments were built without porcelain washtubs, bath tubs, kitchen ranges, refrigerators or electrical fixtures. Today every house hunter insists on what he calls "modern improvements," and by that he means porcelain washtubs, refrigerator, modern tile bathroom and plumbing, and electric lighting throughout. Tomorrow when he says "modern improvements," he will mean these things, but he will also mean electric washing machines, electric vacuum cleaners and the many outlets that will enable him readily to attach any other type of electric appliance that the family will desire.

The trend in this direction is already pronounced. The New York Edison Company, which is in close touch with manufacturers and distributors of electric household equipment, recently sent them a questionnaire that brought 67 per cent. replies. Sales were reported for last year amounting to $4,000,000 and it is expected that this year's sales will total $6,000,000. Mr. John F. Kelly, Manager, Bureau of Show Room Sales of this company, made the statement to Building Age that in three or four years electric washing machines, vacuum cleaners and the like would be just as much a part of the house as the front steps and would soon be required by tenants.

Some idea of the general demand for this equipment is gained from the statement that one manufacturer alone has 500,000 electric washing machines in use throughout the country today, and the demand for them is steadily increasing.

In view of these facts, it is not surprising to hear companies who furnish electric current say that original contracts for wiring are followed up by house owners with contracts for additional wiring.

A large development company in the East was recently obliged to rewire one of its apartment houses to provide more outlets in the rooms. If adequate wiring and outlets had been provided when building, this after expense would have been avoided. The extra cost of doing this work after the building had been finished was about $60 a room, whereas, they estimate, it could have been done for $20 a room or one-third the cost while building operations were still going on. This same company is now providing ample wiring and outlets for electrical appliances on all their future work and, at the suggestion of Building Age, is thinking seriously of furnishing some of their new apartments with electric household equipment.

BUILDERS and contractors should give heed to the present-day demand for electricity, for modern conveniences generally, in doing which they will find their houses rent and sell more readily. A responsible representative of one of the large development companies in the country ventured the opinion to Building Age that the provision of adequate wiring and outlets for electrical equipment would add at least 10 per cent. to the selling value of the property.

The popular demand for electrical homes is growing more insistent every day and builders are responding quickly. California and the West have led the way in this matter, but the rest of the country is not far behind.

On the following pages are illustrated houses in Los Angeles and Oakland, California, that are adequately provided with outlets for electric appliances used in the home.

ELECTRICAL HOMES CAPTIVATE CALIFORNIA

For years we have dreamed of you, California, in the land of eternal summer, where gentle breezes kiss the golden fruit and rustle softly in the luxuriant foliage around your houses. We have envied you the beautiful landscape in which you build your homes, and now you add another charm to lure us West—the Home Electrical. We're coming, some day, to lunch electrically with your sunkist ladies on this Oakland porch; to dine at this magic table in Los Angeles' first electrical home, and to hear a bit of music as your ladies' fingertips electrify the snows of your mountains into radiant warmth and softened light. Keep on building electrical homes—and save one for us.

elp to make the oldtime parlor a
eal living room by anticipating
electrical needs

When the builder puts electricity into kitchen and laundry, Old Dame Drudgery departs

0 people
pected this
me Elec-
al in one
, and 75,000
hree weeks.
't there a
on here for
u, Mr.
Builder?

Pretentious? Surely, but modern conveniences will appeal equally in the more modest homes. Why not build electrically, Mr. Contractor?

FITTING UP THE HOME ELECTRIC

Nursery

Two wall outlets for the use of.
Milk Warmer   Immersion Heater
Heating Pad   Hair Dryer
Radiator   Curling Iron
Sterilizer   Fan   Cleaner
Toy Transformer for
Electrically Operated Toys

Bedrooms

Wall or baseboard outlets
for the use of:
Curling Iron   Boudoir Lamps
Hair Dryer   Radiator
Massage Vibrator   Water Heater
Heating Pad   Fan   Cleaner
Violet-ray outfit   Heating Pad

Sewing Room

Two wall or baseboard outlets
for the use of:
Sewing Machine Motor
Radiator   Iron
Portable Lamp
Cleaner
Fan

Bathroom

Two wall or baseboard outlets
for the use of:
Radiator   Hair Dryer
Shaving Mug   Curling Iron
Shaving Mirror   Massage Vibrator
Immersion Heater   Fan   Cleaner

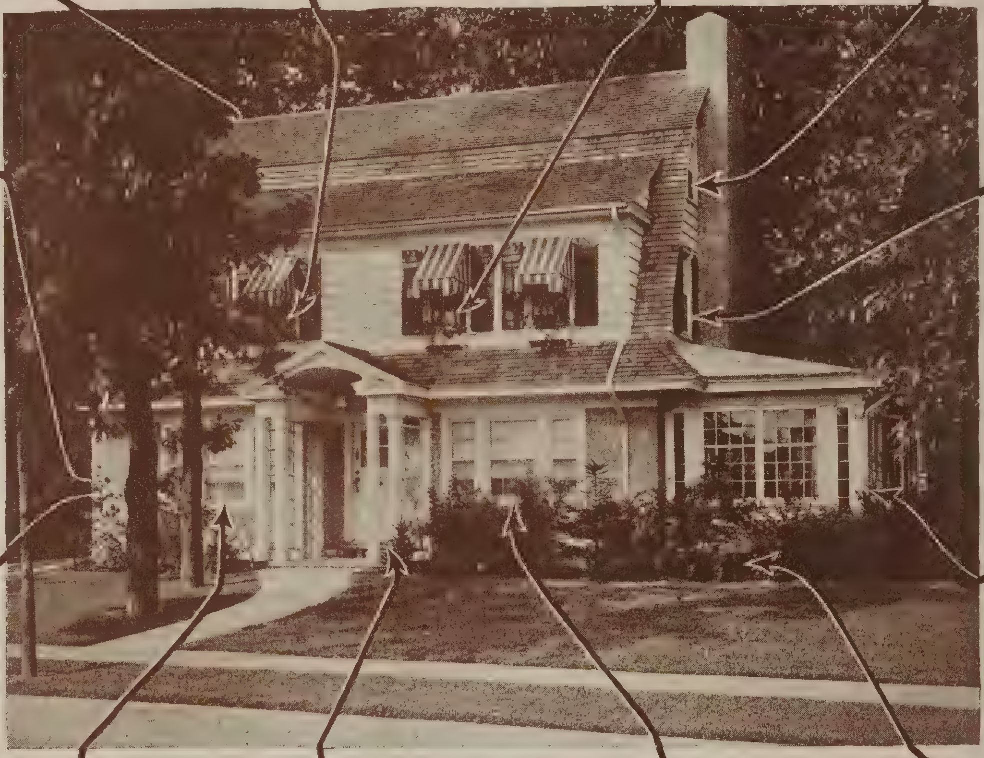
Dining Room

One floor outlet under dining table, also wall or baseboard outlets for the use of

Toaster
Coffee Percolator
Tea Samovar
Grill
Disk Stove
Egg Boiler
Chafing Dish
Drink Mixer
Candle Sticks
Cleaner   Fan

Kitchen

Wall outlets for the use of:
Cooking Appliances
Iron   Fan
Bread and Cake Mixers
Dish Washer
Refrigerating Machine
Utility Motor for
Meat Chopper;
Coffee Mill
Grinding, Polishing and Buffing Machine
Fireless Cooker



Den

Two wall or baseboard outlets for the use of:
Reading Lamp
Desk Lamp
Cigar Lighter
Chafing Dish
Fan
Coffee Percolator.
Tea Samovar
Grill
Toaster
Cleaner
Radiator

Porch

Two baseboard outlets for the use of:
Fan
Reading Lamp
Cooking Appliances for Out-of-Door Breakfast
Afternoon Tea and Evening Lunches in the Summer Time

Pantry

Wall or baseboard outlets
for the use of:
Cooking Appliances
Plate Warmer
Percolator
Fan

Front or Reception Hall

Wall or baseboard outlet
for the use of:
Electric Clock
Floor Lamp
Cleaner
Fan

Living Room

Baseboard outlets for the use of:
Piano Lamp   Tea Samovar
Coffee Percolator   Chafing Dish
Cigar Lighter   Phonograph Motor
Corn Popper   Xmas Tree Outfits
Fan   Cleaner
Lamp for Writing Table
Electric Piano

Basement

Outlets for the use of:
Iron
Washer
Ironing Machine
Ice Cream Freezers
Also bell ringing transformer permanently installed.

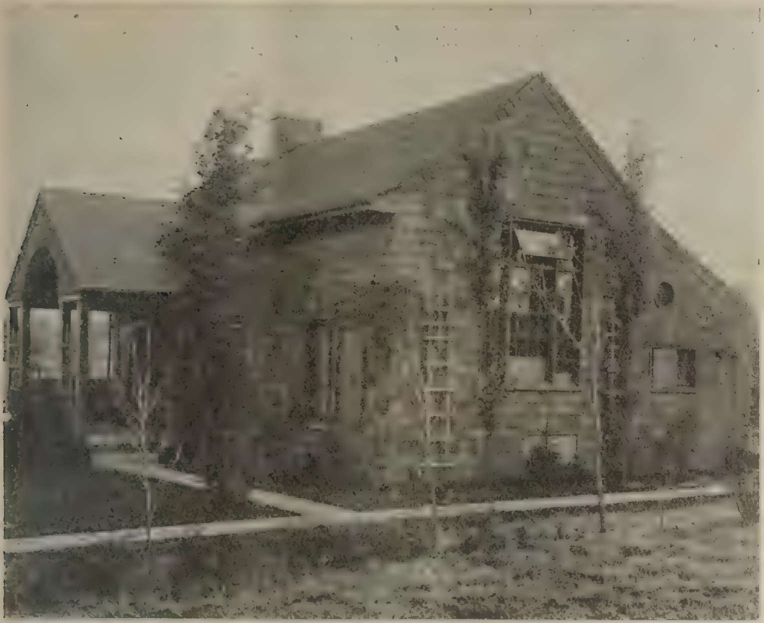
WILL YOU MAKE THE HOUSE EASY OR HARD TO LIVE IN? WILL YOU MAKE IT QUICK OR SLOW TO RENT OR SELL? WILL YOU MAKE IT MODERN AND APPEALING?

WHEN a builder plans the electric wiring in a house he plans either an everlasting comfort or a place where only unfulfilled wishes are. To consider what electricity can do throughout the house, from dawn to dark and through the dark, is to know that it will constantly be called on to contribute to the pleasure and comfort of the household. Wire your houses amply at the start! Show your client the possibilities of the well-wired house and the inevitableness of wanting one.

A Small Studio Cottage

By Roy Seldon Price, *Architect*

THE small studio shown here is an unusual bit of architecture and planning. Structurally it consists of a framework of 2 x 4 studding, which has been shingled. The roof is a simple gable with the severity removed by altering the pitch at the eaves both front and back and allowing the rear part to extend further than the front. But the unusual features in the architecture are the entrance or porch and the sleeping balcony.



This little studio, located at Meridian, Mo., presents some interesting novelties in plan and design

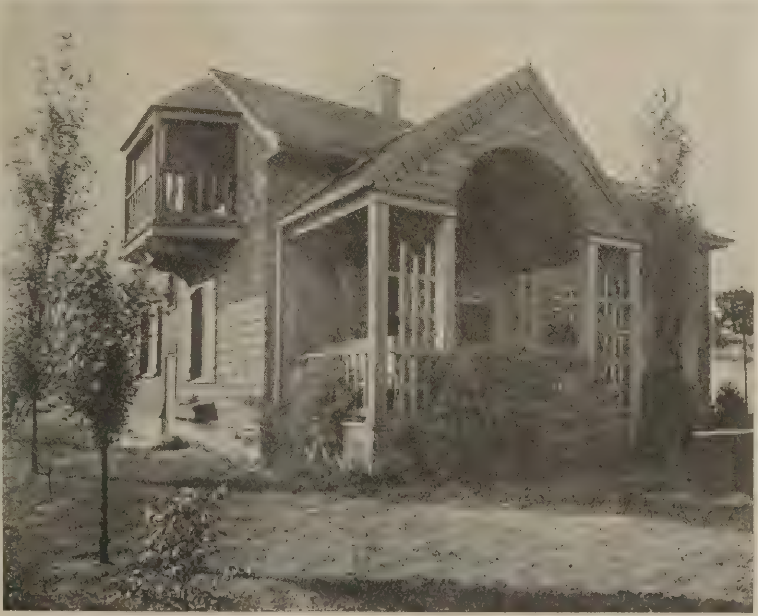
From the porch one enters the studio-living room directly under the balcony at a corner. This room is a surprise, indeed. The ceiling is high because the walls extend the entire height of the house. The room is, therefore, quite in contrast to the low entrance door of the apparently simple cottage.

The north wall of the studio frames the large window seat (above a comfortable roomy window) and is flanked on either side by bookcases and cupboard for canvases and artists' materials and other paraphernalia.

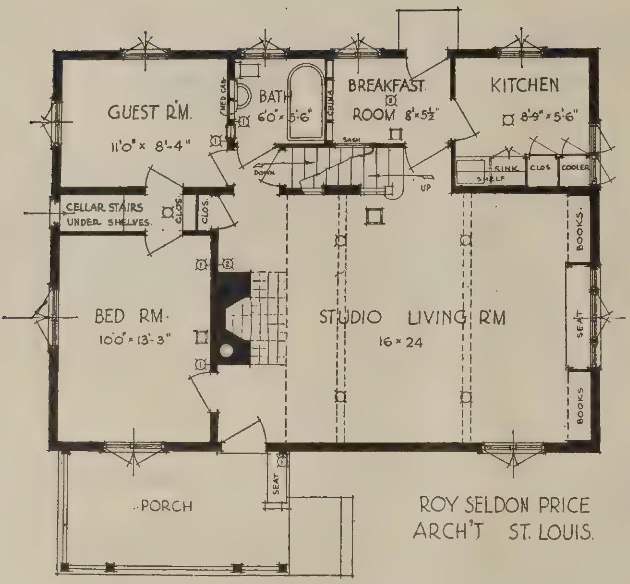
The face of the window seat has an iron grille through which air is drawn down into the hot-air furnace for recirculation. Opposite the window is a large open fireplace directly under the balcony which extends along that side of the wall. Also under this balcony and on either side of the fireplace are doors leading into bedroom, guest room and closet.

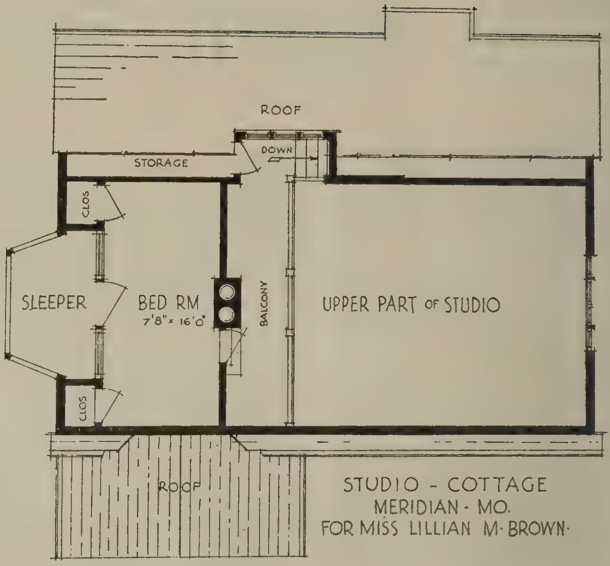
In the center of the wall opposite the porch entrance a rectangular opening reveals the stairs to the balcony which lead to an upstairs sleeping room and sleeping porch. Behind this rectangular opening there is the door to the breakfast room and kitchen and under the balcony, behind the stairs, are doors leading to the bathroom and basement.

The owned wished shelf room for a fine collection of old coppers and bronzes in the breakfast room. But since this room was only 6 by 6½ ft. not an inch could be spared. So on the wall between this room and the bathroom no plaster was used. The vertical studs were dressed, lined on the bath room side only with tongue and



The porch and sleeping balcony are two convenient features that have been well handled by the architect





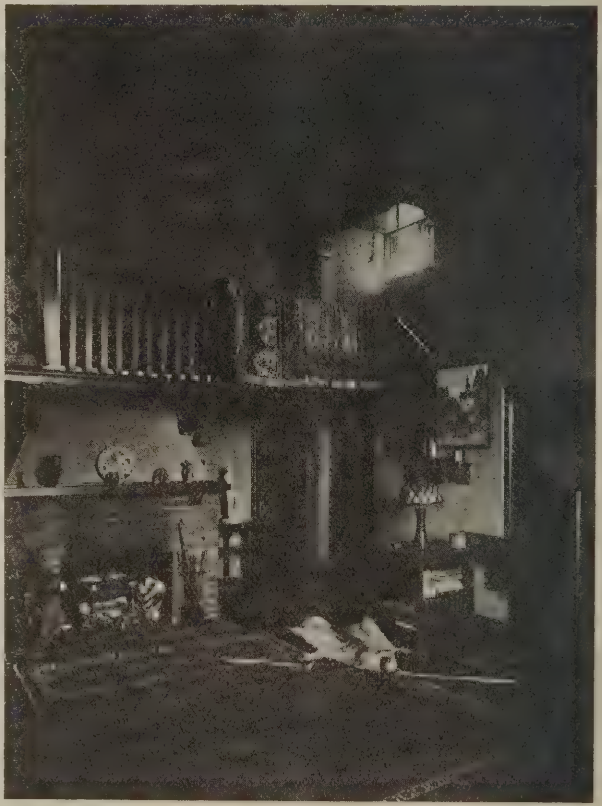
grooved flooring boards carefully dressed, matched and enameled. On the breakfast room side between exposed studs horizontal shelves were fitted as shown on the detail drawing. This cupboard in the wall rests on a dado built from the scraps of oak flooring and capped with some trim left over, this woodwork, stained a soft brown and then waxed, giving a very fine background for the excellent bronzes which fill the shelves. The dado in this room contains fixed sash of ribbed glass which gives abundant light on the basement stairs.

The kitchen is indeed a French kitchen thrifty of steps. From the middle every fixture can be reached without moving. One-half of the upper cupboard is a cooler ventilated by a corner sash and screened opening to the roof space.

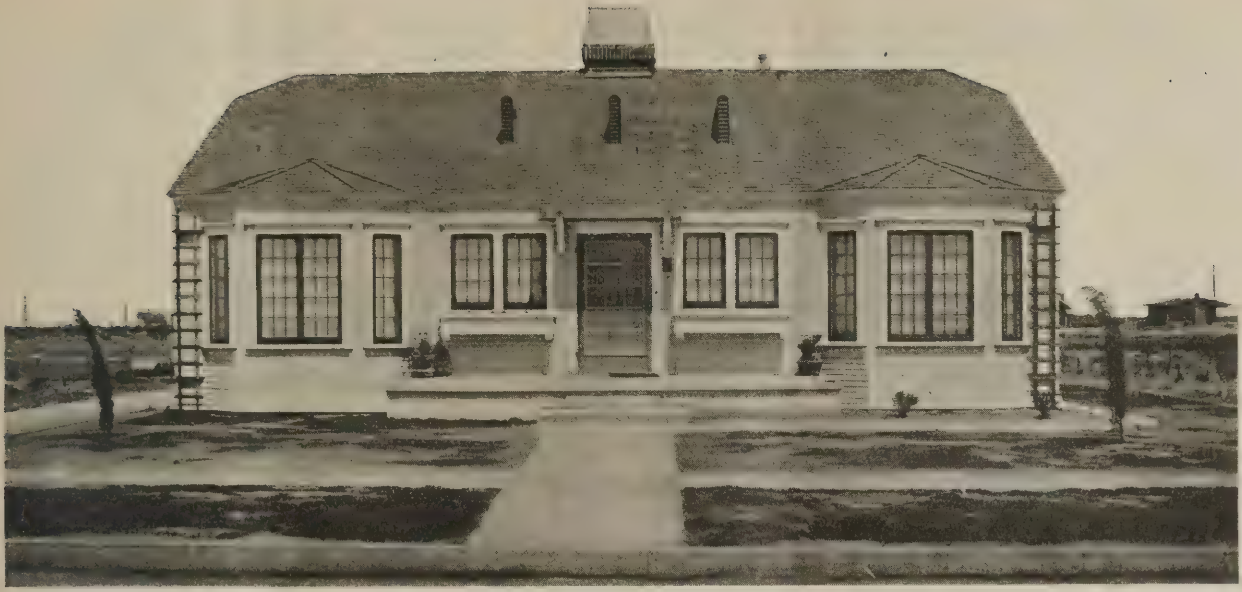
Another product of "Inch Planning" is the exterior door and stair to the basement. A stock two-panel door was hung 2 inches above grade at the south end of closet between the two bedrooms. High bulkhead shelves in the closet give ample space for bandboxes, trunks, etc., and afford sufficient headroom below for the cellar steps. This door is glazed in both panels with wire glass, giving abundant light down cellar stairs.

After the effect of the unusual exterior has worn off one realizes that this little cottage is really pleasing, with its lattices, trellises, louvres, odd-sized windows, solid blinds and squatty looking chimney. One even wonders how six serviceable rooms can be fitted into such a small space. And yet they are there and they are convenient and serviceable.

The rectangular plan and the simple gable roof indicate at once an economical construction and show to the accustomed eye that the owner is getting real house value for the money spent.



It is unusual to find a real studio in a house whose exterior is so unpretentious



SIX-ROOM BUNGALOW IN LONG BEACH, CAL.
W. E. Allen, Architect

An Economically Planned Bungalow

By CHARLES BALMA

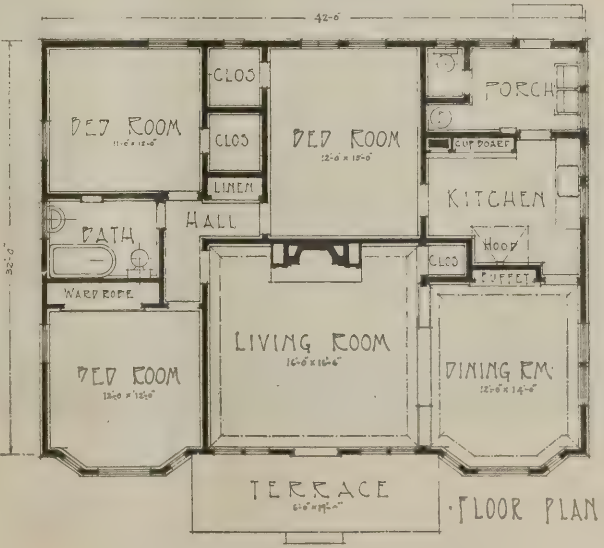
THE six-room bungalow illustrated herewith is especially deserving of study for its economical utilization of floor space. Although it is but forty-two feet wide by thirty-two feet deep, all the rooms are of good dimensions, and, in addition to the living room, dining room, kitchen and three bed rooms, there are the usual bath room and rear entry porch, as well as a number of excellent closets and practical built-in features.

The front entrance is by way of a cement-floored terrace, the door itself, protected by a simple little hood-like roof extension, being of glass. The outside walls are of narrow re-sawed siding, painted white, and the only trimming is comprised of dark green rose-ladders at each front corner and green window sash. The roof is shingled and painted grayish green, and neat little flower boxes beneath the windows at either side of the entrance constitute attractive details.

The front door, it will be observed, opens directly into the living room, which occupies the center of the plan, and the dining room and one of the bed rooms, to the right and left respectively, are planned with forward extending window bays. A small L-shaped hall, reached from one corner of the living room, immediately connects with each of the three bed rooms and the bath room, bringing all of these rooms into very close and convenient relation.

In referring to the plan, particular notice should be taken of the location of closets and built-in features. The front bed room, for instance, has an ex-

(*Continued on page* 50)



Combined Bank and Market Building

By FRANK A. SCHILLING, *Construction Engineer*

DURING the last few years rentals and property values have increased to such an extent that it is practically impossible to operate groceries or other small stores in the congested districts of our larger cities and realize a fair return on the investment.

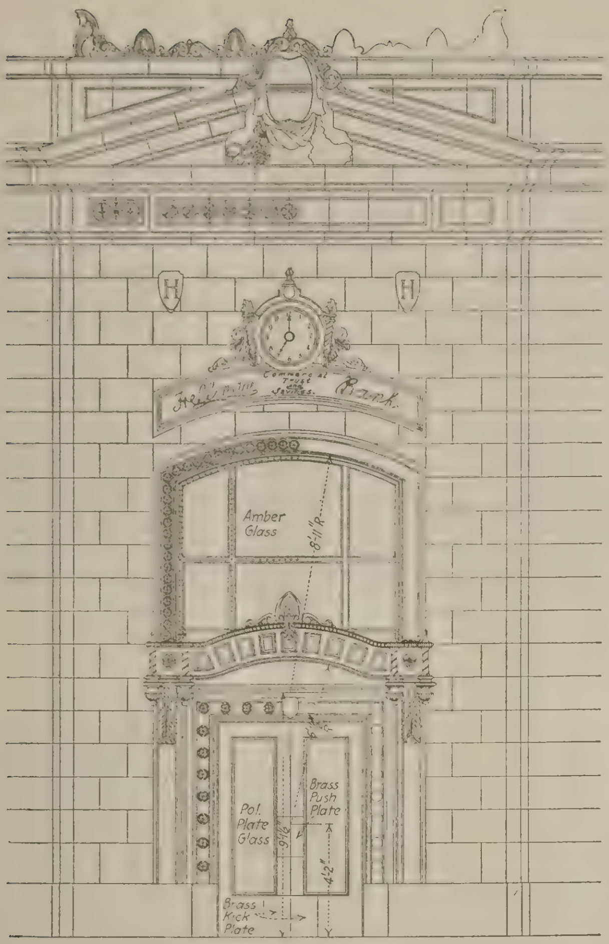
It has not been unusual in the past to see banks associated with office buildings to the extent that the stories above the banks were devoted entirely to a great variety of business offices. It is somewhat out of the ordinary, however, to see banks and small stores in the same building.

Such a combination of Bank and Market Building, as it is called in California, is described in this article and was designed by Walker and Eisen, architects. The engineering was done by the author and the C. J. Kubach Company were the general contractors who did the erection. The cost exclusive of the banking fixtures, was $65,000.

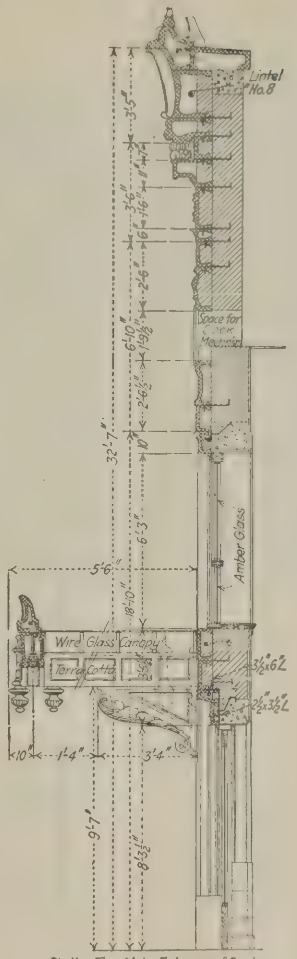
The lot was very irregular, both in plan and contour, which necessitated placing all the market floors on a rather sharp incline. This also necessitated building the trusses at different heights, though the surface of the roof is uniform. It was found necessary to design fourteen different sizes of trusses.

The market contains approximately 18,900 square feet of floor space, and 3,400 square feet of basement. The interior, on account of the comparatively

THE soil was of a very unstable nature and it was necessary to go to a depth of fourteen feet in places. Brick, having been found to be cheaper than mass or reinforced concrete, was used for the foundation.



Elevation of Main Entrance of Bank



Section Thru Main Entrance of Bank

Detail of Bank Entrance

dry climate, was plastered directly on brick without furring of any kind, and was painted white, making a very bright room. Numerous skylights were placed in the roof, adding to this brightness.

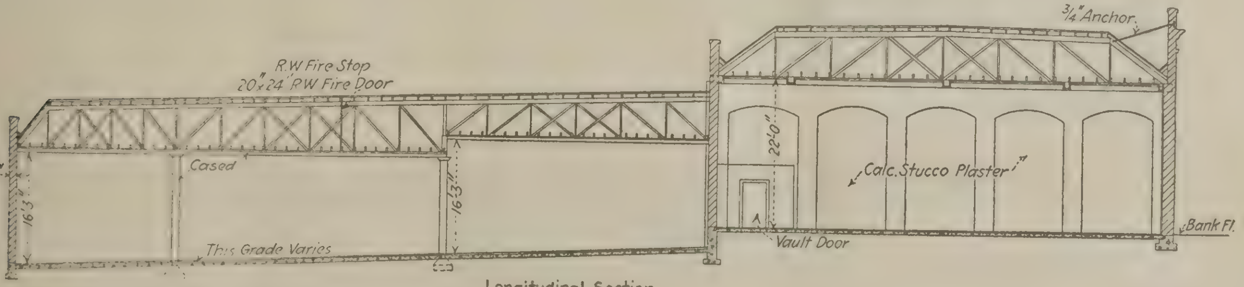
The bank, which occupies the corner of the building, is very interesting. The exterior has been done in matt glazed terra cotta, while the market portion has been plastered with California stucco, a local product. The difference in the two parts is further accentuated by the varying heights of the walls.

The interior of the bank has been treated in a distinctive manner, the walls being finished with California stucco, marked off to indicate stone. The wainscot around the public space is of terra cotta, and matches the banking fixtures, which are of the same material. The ceiling is broken up by heavy beams. The floor of the bank lobby is covered with grey marble, while that in the working space is covered with Oregon fir, covered with heavy linoleum. Heat is provided by the use of gas radiators, vented through the walls.

The bank fixtures are quite novel in design, as well as construction. The base and front are of terra cotta, backed up with common brick, and a marble slab forms the top. The grill work and wicket doors are of oak and plate glass. Booths have been provided for safe depositors and a retiring room for women depositors. Emergency lighting is provided.

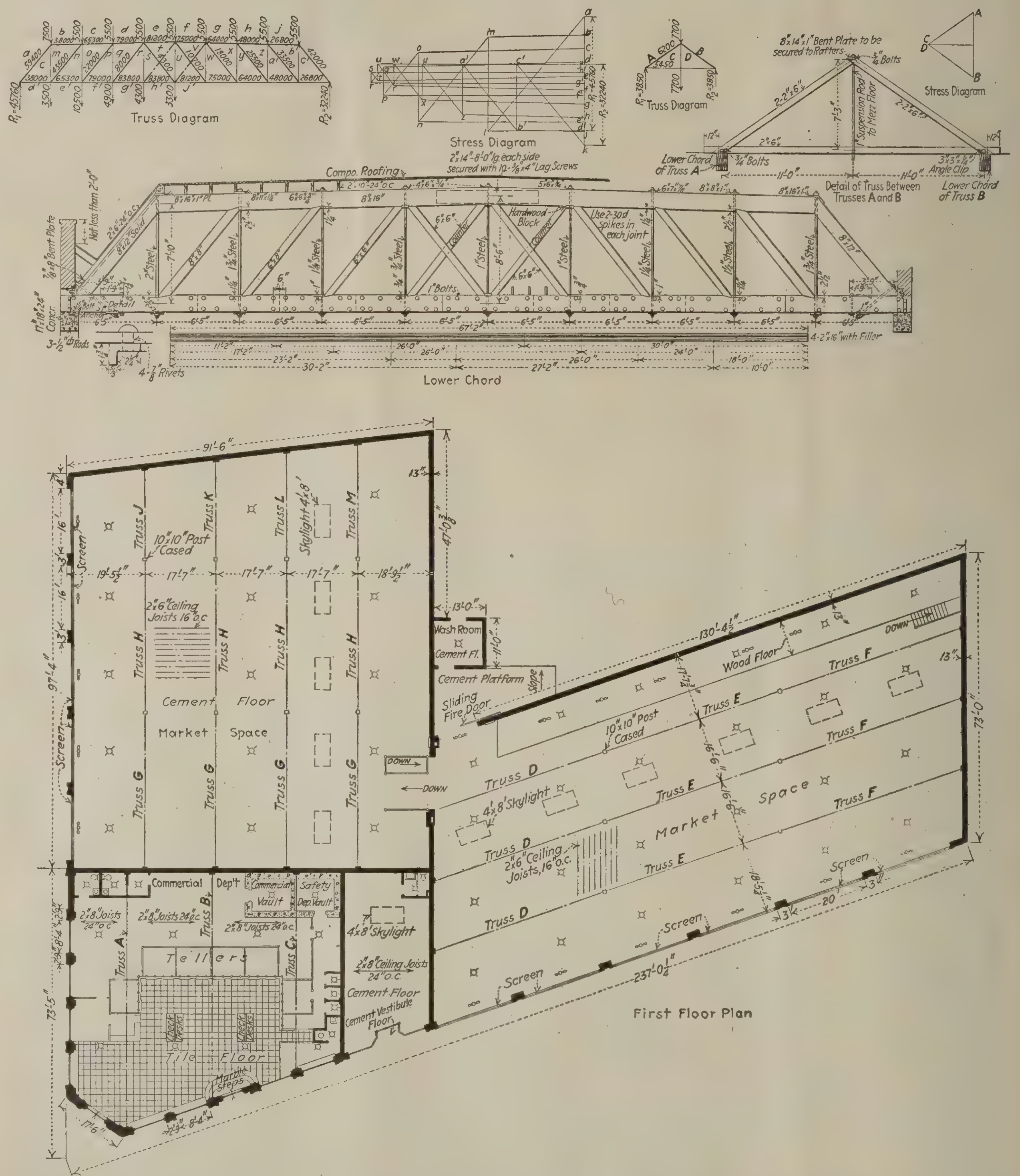
A large reinforced concrete vault protects the banks funds and safe deposit boxes.

A balcony covering about one-third of the floor space is suspended from the roof trusses, the longest of which is 65 feet with 8 x 16 upper and lower chords. All of the interior trim is of oak, which was given two coats of dilute ammonia, making a very pleasing fumed finish.



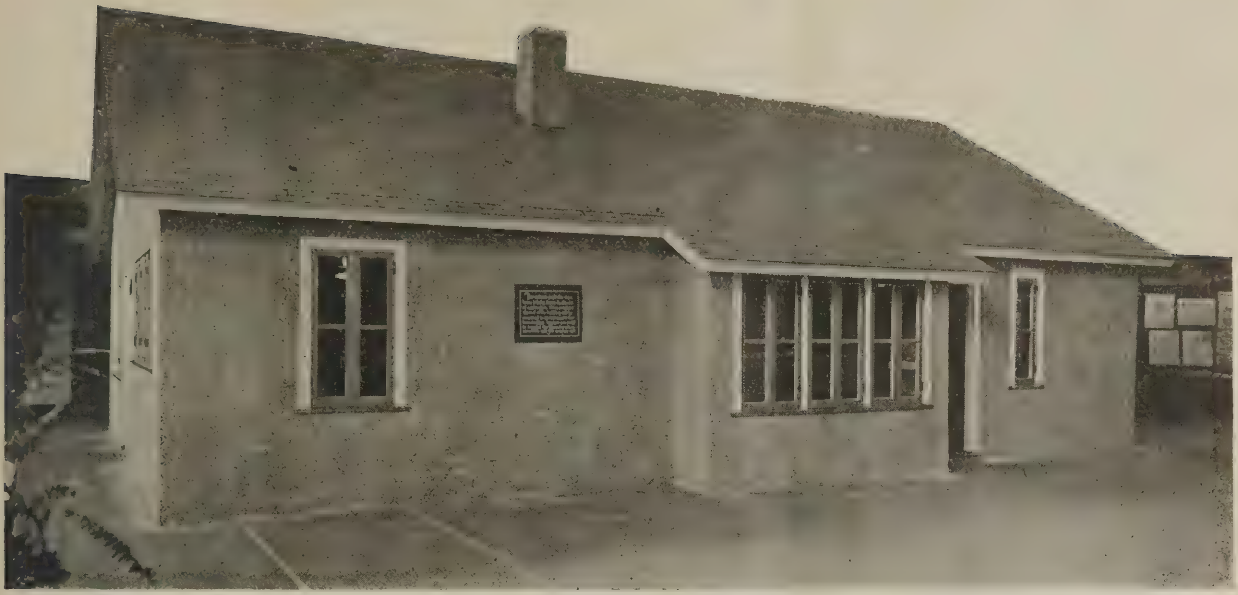
Longitudinal Section

Typical Section, Showing Floor Grade and Trusses in Place



GROUND PLAN AND TRUSS DETAIL OF HELLMAN BANK BUILDING, SAN FRANCISCO, CAL.

Walker & Eisen, Architects
Frank A. Schilling, Construction Engineer



BUNGALOW ERECTED AT THIRD ANNUAL OWN YOUR HOME EXPOSITION, NEW YORK CITY

R. K. Talbraith, Architect, Indianapolis, Ind.

Third Annual "Own Your Home" Exposition, New York City

THE "Own Your Home" Exposition just concluded in New York served a good purpose, While many visitors, recalling the large scale on which the show was conducted last year at Grand Central Palace, seemed to feel that this smaller exposition was inadequate to express the full possibilities of a very vital movement, yet it was generally admitted that information of the most valuable and desirable kind was made available.

It is no longer necessary to "sell" the idea of home-owning. The "Own Your Home" movement is safely launched, and the feeling is strong for independence of rent day, for living in a new, modern, cheerful house with grounds around it all one's own, and for having these things at no greater cost than the usual rent would demand.

But there is no doubt that an exposition that shows exactly how to go about home owning—that tells how to finance the project and takes one through all the intricacies of selecting a plot, deciding on proper and appropriate building materials, that teaches the art of planning for convenience, beauty and dignity, that demonstrates the working of the best modern equipment for comfort, economy and utility—stimulates a wholesome aggressiveness in getting definitely under way and really starting.

All of this the "Own Your Home" show did. Thousands of people went, studied the outlook, and are now taking the necessary steps to live in their own homes.

The feature of particular interest was the fact that every one of the dwellings presented, whether shown as models, or illustrated by photographs and plans, was developed so simply and so conveniently that it might truly be called a servantless house. The housewife unassisted could care for such a house, thus conserving room, and eliminating the cost of help as well as the inevitable wear and tear that present-day indifference in domestic service causes. It could be readily noted that much favorable attention was given to electric appliances as money savers and work lighteners, and there were, in fact, exhibits of co-operative apartments equipped electrically in the same way that much furniture today is built-in—ready for use and part of the structure itself.

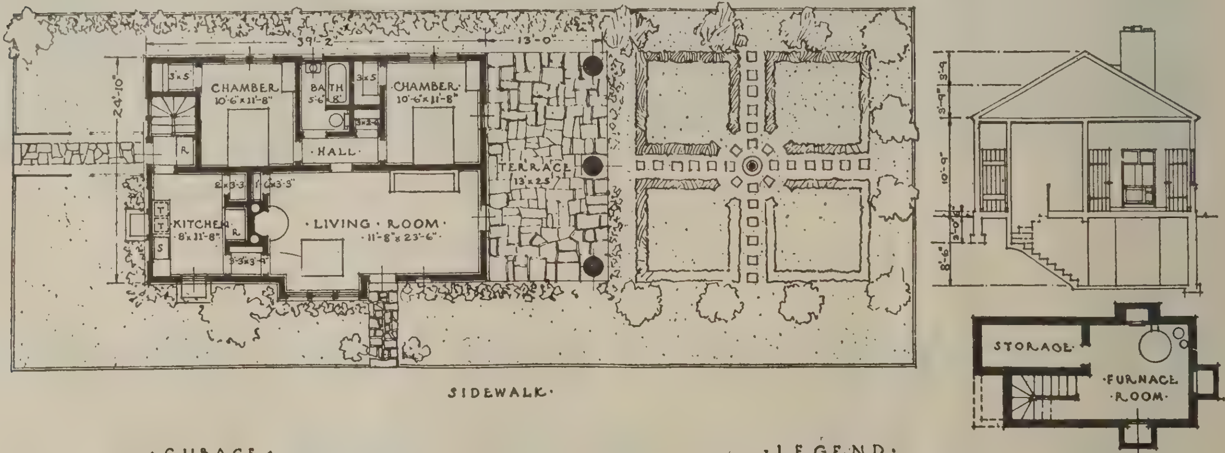
Most conspicuous in the "Own Your Home" exhibit were the rows and rows of prize winning designs in the small house competition that was the subject of the April issue of Building Age. There many of these were reproduced, together with a full text report of the results. Several collections have been made of these in book form and may be obtained from Moore, McCord, Gilchriese & Associates, Inc., 24 West 39th Street, New York, at small cost.

Building Age had a booth at the show and representatives dispensed information and suggestions to the many people who sought knowledge.

There was no detail in the whole process of acquiring a house that was not thoroughly covered by exhibits.

The business of the builder, the architect, the home furnisher, the craftsman—all those whose work goes into a completed house—will undoubtedly be stimulated and helped by the interest awakened in this show, and if it is taken as a point of departure, and given the importance it deserves, there is no doubt that a great advance will be made in upbuilding the country and getting quickly to a normal basis. A good type of house is presented here, typifying the kind of examples exhibited.

The "Own Your Home" show fully demonstrated that it costs no more to own a house than to rent one. That much settled, nearly everyone sees the undeniable advantages of home owning, and little work is necessary to get a project under way.



CUBAGE

25 x 39 x 18 = 17550 CU. FT. BODY OF HOUSE
10 x 2 x 14 = 280 " " BAY WINDOW
12 x 25 x 8 = 2400 " " BASEMENT
13 x 25 x 14/2 = 2275 " " TERRACE
TOTAL = 22505 " " IN HOUSE

LEGEND

WALLS—STUCCO WITH EXPOSED AGGREGATE IN WARM BUFF TONE
ROOF—SMALL CORDOVA TILE WITH FULL RANGE OF COLOR RUSSET TO RED
WATERTABLE CHIMNEY TERRACE ETC. WEATHERED FLAGSTONE

BASEMENT

Architectural League of New York Holds Annual Exhibition

THE Architectural League of New York, in its 36th annual exhibition just held in the new wing of the Metropolitan Museum of Art on Fifth Avenue at 79th Street, has set a record of achievement in architectural exhibitions that it will be difficult for other architectural societies to equal this year.

This exhibition marks the high spot in a showing of architecture and the arts allied to it, and has been so dextrously arranged, so finely assembled that even the most captious critic may find nothing to criticize adversely. It was the Architectural League that first recognized the value of the work of the various building trades and crafts to which architecture was allied, and as far back as three years ago began to encourage these allied elements to participate in their exhibition. The culmination of this valuable team work is to be found in its highest development in the present exhibition.

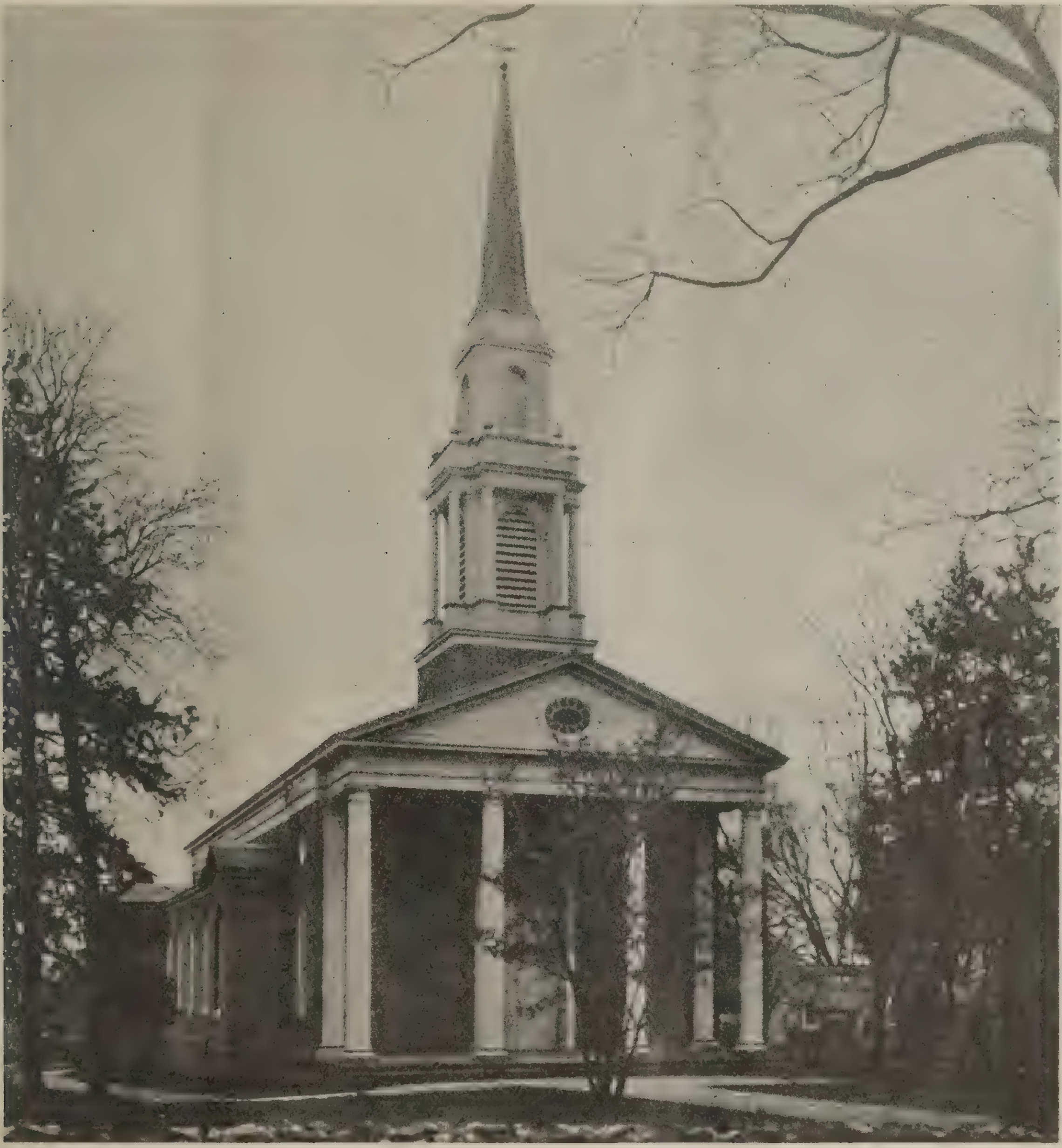
Perhaps the League is the first society to recognize thus formally that while architecture is the highest development of all the arts, it is also, in some of its activities, a highly developed business. We are, therefore, not surprised to find in this exhibition groupings of exhibitions of building and contracting firms, the well designed and decorated interiors of representative decorators, and an excellent display of craftsmanship in metals, glass and textile fabrics.

All of these have been so well grouped that the value of the architectural exhibit is enhanced, and its relation to the other things shown well brought out.

This year, as last, accents the steady upbuilding of the country estate both in the architectural treatment of the buildings and the beautiful landscape architecture development that has been quietly going forward, and that has only recently reached the state where it appears to advantage.

The number of houses that are shown are the best types of domestic architecture, and prove the contention that the architects in this country are educating their clients how properly to spend their money.

Prominently and more beautifully shown than in any other exhibition, is the sculpture, notable for its well-considered placement. In fact, the division of sculpture is so important and so dignified that it would constitute a worth while exhibition in itself.



SPRUNT MEMORIAL PRESBYTERIAN CHURCH, CHAPEL HILL, N. C.
Hobart B. Upjohn, Architect
Thirty-sixth Annual Exhibition, Architectural League of New York

This year the mural painters have had better opportunity to display their work than ever before, and they have taken advantage of it so that the walls of the various galleries are ablaze with beautiful colors, and the work of the mural painter has been splendidly selected and hung.

SAVINGS INSTITUTION, WILLIAMSPORT, PA.
Godley & Sedgwick, Architects

Thirty-sixth Annual Exhibition, Architectural League of New York

WHEN one considers the lean years from which we are just emerging, the retardance of building and the present stagnation, he will be impressed by the thoroughness with which the League has searched the field for new and important work, the manner in which it has either been photographed or drawn, and its placing in its surroundings.

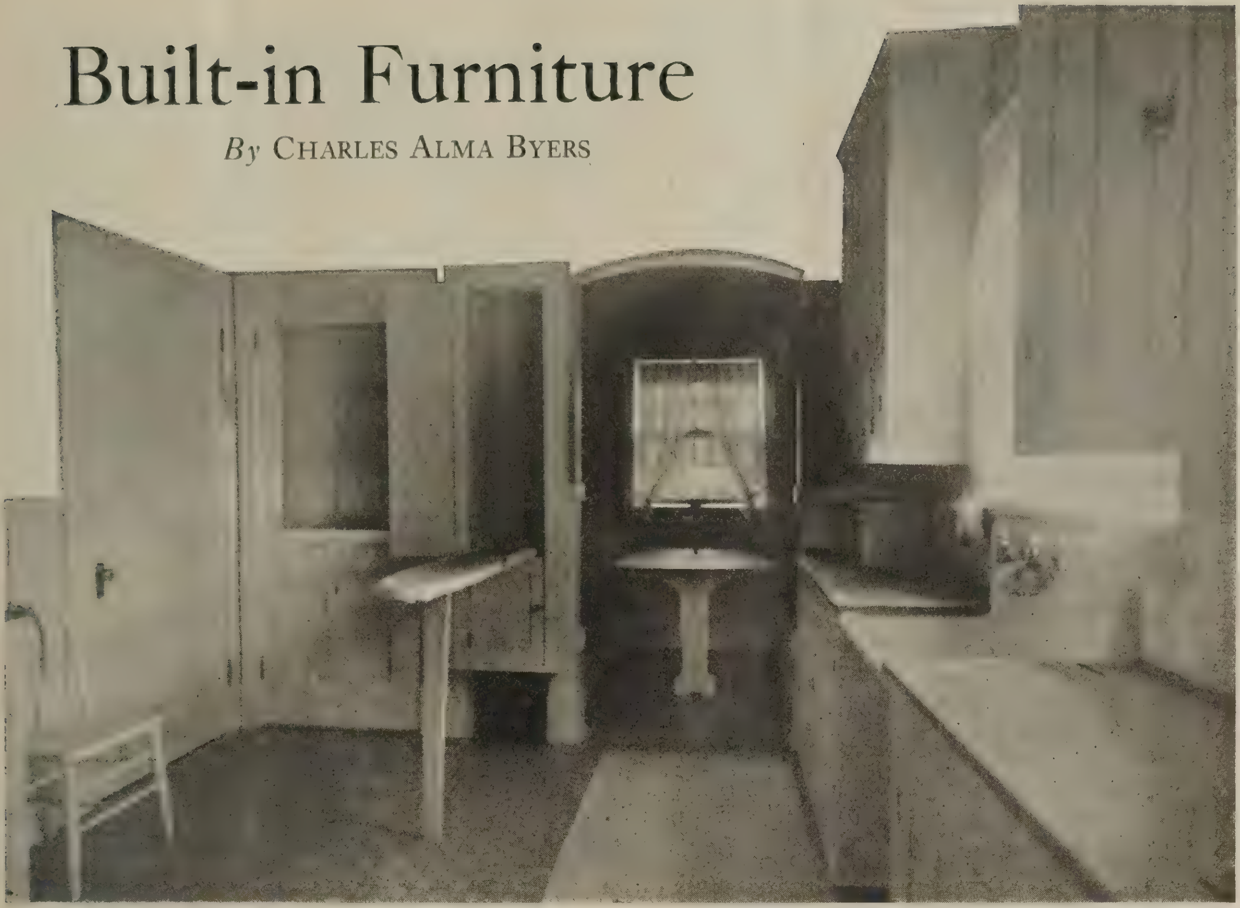
TO set down in detail every good work in this showing of architecture and the allied arts would be practically to reprint a list of the exhibitors. Nor would it be possible to describe at length, or give any sort of an accurate idea as to the way the various committees have transformed this partly completed gallery into a very garden of the arts. The whole thing must be seen to be appreciated. There is one thing, however, that is quite certain, and that is that the League, in carrying to execution so dignified a showing of architectural work, has put the entire profession under an obligation because it has demonstrated the right of architecture to its high position as an art, and at the same time has also demonstrated how practical architects may be when they set about a co-operative undertaking of this nature.

The annual awards of medals and certificates were announced as follows:

In architecture, to Mr. Charles Z. Klauer; in painting, to Mr. Eugene F. Savage; in sculpture, to Mr. John Gregory, vice-president of the League; in native industrial art, a medal awarded for the first time, to Cheney Brothers for the best designs of dyeing and craftsmanship in silks; the Avery Prize in sculpture, to Mr. Leo Lantelli, and in landscape architecture to James L. Greenley. Mr. Hewlitt also announced the following awards offered in a competition by the Eastern Terra Cotta Company: First, to Messrs. P. Harold Sterner and Salvatore Grillo; second, to Messrs. Grenville Rickert and Benjamin Moscowitz, and third to Francis J. Creamer.

Built-in Furniture

By CHARLES ALMA BYERS



A kitchen with attractive built-in features. The disappearing ironing board, the well-planned cabinets, and the breakfast nook are undeniably convenient

BUILT-IN features commend themselves for wide use. They save steps and energy, are easily provided and the economy of using them is constantly increasing their popularity. Useful examples are presented herewith. In the accompanying illustration is a disappearing ironing-board that, because of its extremely simple design, may be built with little extra work or cost and will add much to a kitchen's desirability. At least housewives in general have looked upon the feature with such favor that it has come into quite pronounced popularity.

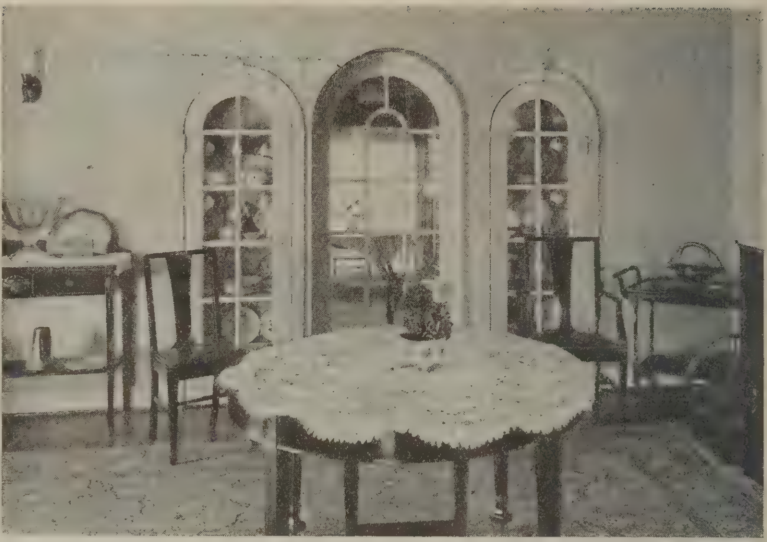
By raising up on the outer end the board folds up when not in use into a little cabinet and, by closing the door of this cabinet, it is completely concealed. In inside dimensions the cabinet is about 46 in. long by 14 in. wide and 3 in. deep. The bottom is raised 34 in. from the floor, and the top of the frame is practically on line with the top of the ordinary door casing. The ironing-board is fastened at the large end to the inside wall of the cabinet, near the bottom. At the other end of the board is a single supporting leg, which is hinged to the under side. This leg folds against the under side of the board and the board itself swings against the back wall of the cabinet.

Directly underneath the ironing-board is a small cabinet for storing the electric iron and in this is also concealed the electric plug. The iron, therefore, may be put away in the cabinet without the trouble of disconnecting it.

Incidentally, the illustration further shows a good arrangement of kitchen sink, built-in cupboards, and so forth, as well as a practical little breakfast alcove that is convenient for the housewife.

ANOTHER illustration shows an unusually pleasing and effective grouping of a pair of built-in china cupboards with a glass door. Simulating the Colonial style, the doorway is designed with an arched or rounded top, and the china cupboard at either side is similarly characterized. Being also of glass, the doors of the cupboards harmonize the arrangement to a still greater extent. Incidentally, the doorway intervenes between the dining room and a small breakfast room beyond.

Each china cupboard contains five shelves, besides the floor or bottom space, and these shelves are eighteen inches in length by ten inches deep. The room is finished in white, and the cupboards and doorway naturally correspond, while the knobs are of glass. The cupboards are fully recessed into the wall, only the casing extending beyond the ordinary wall surface.

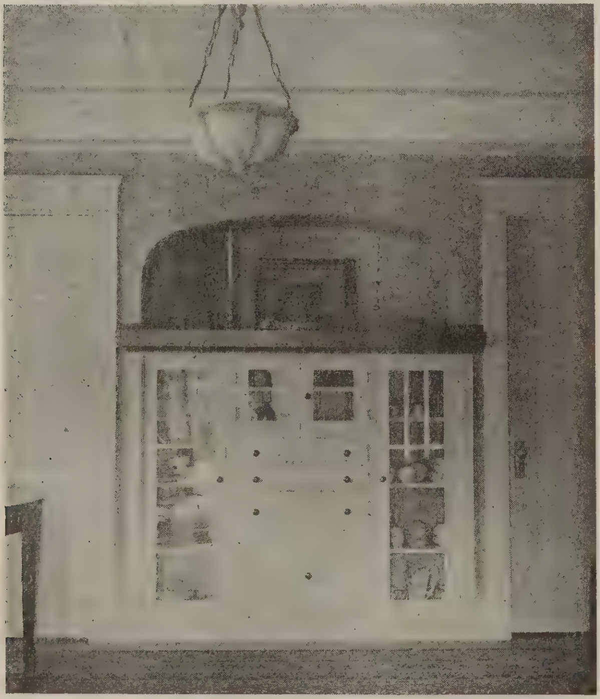


Built-in Colonial China Closets; the doorway properly designed to harmonize, leads into a small breakfast room

THERE is reproduced also a neat and practical built-in dining room buffet. It contains a four-shelf china compartment at either end, and in the middle an upper and a lower shelf compartment with three drawers intervening. The two china compartments and the top shelf space are provided with glass paneled doors, and the pair of doors of the bottom shelf section is of wood paneling.

The feature is recessed into the wall, with an open recessed space above, arched at the top, by which a counter-shelf is left for bric-a-brac. The space utilized by it is about 4 ft. wide. To match the other woodwork of the room, the buffet is constructed principally of pine, finished in old ivory, with counter-shelf consisting of mahogany.

A novel and practical idea in attic stairway designing is shown in one of the accompanying illustrations.



This capacious buffet serves many useful purposes in the dining room. There is space for china, linen, and other daily requirements

In cases where the attic is to be utilized for storage purposes only, which means that access to it will be required but occasionally, a disappearing stairway of the kind here illustrated is indeed especially satisfactory. Its advantages, briefly, are that it necessitates no special floor space and that, without entailing a door for expressly concealing the ordinary type of stairway, it both hides the attic from view and prevents any upward escape of heat.

This stairway, it will be observed, lowers into the regular connecting hallway, and when not in use is raised into such a position as to close the opening and form a natural part of the hallway ceiling. Treads and sides are simply and inexpensively constructed and left unpainted or otherwise finished, but the under side, which comes into view when the steps are raised, is of tongue-and-groove material and painted to match the rest of the woodwork. The stairway is fastened at the upper end with a pair of strong hinges. At the other end is fastened a small rope that extends through a pulley anchored to the attic rafters and is equipped with a counter-balance. A short stick with a hook in one end engages a ring on the under side for pulling the stairway down, while the counter-weight makes it an easy matter to push it up into the closed position.

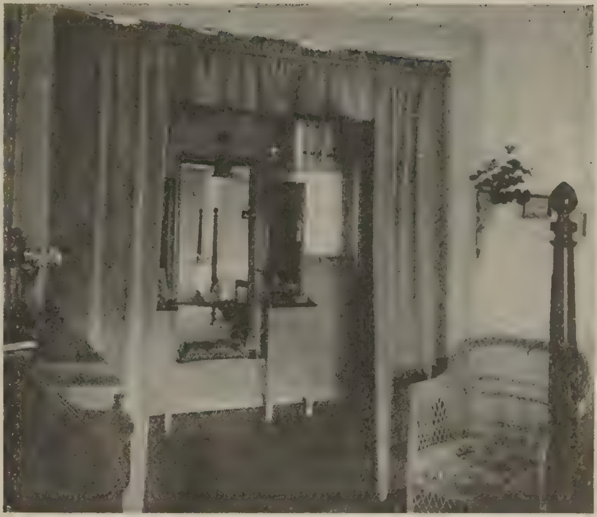
THE combination of bookcases and fireplace, illustrated here, is an unusual and very effective arrangement, largely, as will be noted, of brick construction. Being features of a bungalow living room, they combine to extend the full length of one outside wall, and the tops of the bookcases and the mantelshelf of the fireplace combine to form a single continuous deep counter-shelf. Both the fireplace opening and the bookcase doorways are designed with arched tops, and a pair of small casement windows is located just above each bookcase.

The brick used for the combination of features is of grayish-buff tone, and the woodwork of the room, which includes the long counter-shelf and the bookcase door frames and sash, consists of pine, finished in fumed-oak stain. Each bookcase contains shelf space for three rows of books. The room is nearly 17 ft. in length.

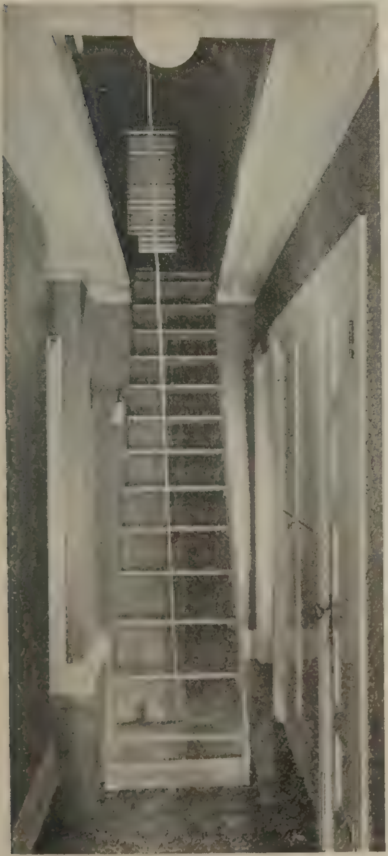
AN attractive and neatly designed built-in dresser is sometimes located, as will be observed, in a small dressing alcove, partitioned off from one end of a bedroom with heavy portieres. It is so placed that it receives natural light from a small window at either side, while directly above it is a bracketed electric light.

In design the dresser is comparatively simple, making it very easy to build but quite practical. Briefly, it is comprised of a pair of identically planned drawer compartments, of four small drawers each, supported about 7 in. from the floor, both by being fastened to the wall and by legs, which compartments are linked together by a little counter-shelf table. Above this counter-shelf is a large plate-glass mirror, with a small mirror of the same kind hinged to it at either side.

The feature is constructed of soft pine, and is finished in old ivory enamel, save for the tops of the drawer sections, which are ebonized. The maximum height of these drawer compartments is about 39 in., while they extend from the wall, in top measurement, about 12 in., and each is approximately 15 in. wide.



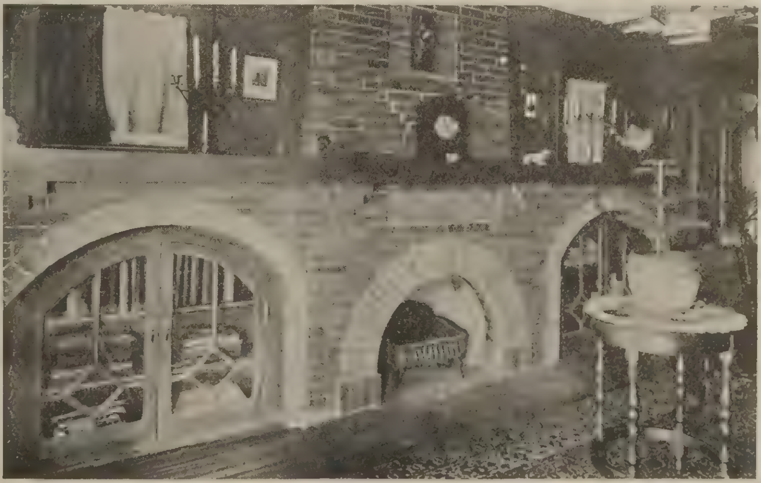
A built-in dressing table with full-length mirror and many drawers will be popular in bedrooms and guest rooms



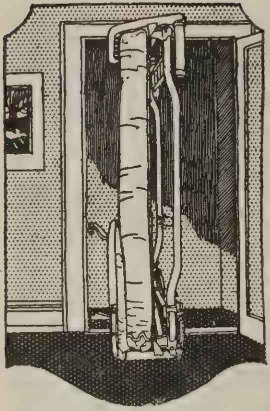
When the attic is used only occasionally this type of stairway saves considerable space

CONGESTED conditions in the cities frequently necessitate economy in designing the small house or apartment to the extent that no more rooms are provided than the family actually has need for. The result is that the once common spare bedroom or two has practically ceased to exist in smaller houses. The room that, in emergencies, can be made to do the work of two is that equipped with the In-a-Door type of bed as shown on page 36.

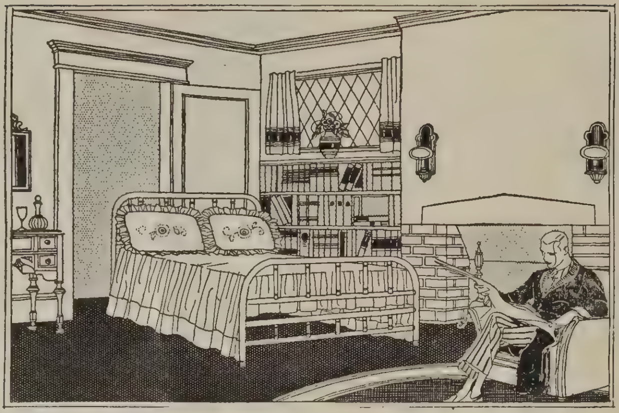
This built-in feature serves a useful and necessary



This combined fireplace and bookcase arrangement extends the full length of the wall and provides an artistic as well as an economical feature of interior planning and design



Ready for Closing



The In-a-Door Bed Opened at Night

Closed for the Day

purpose in many small houses where space must be saved. Such a bed is shown here. The head is hinged to the back of its closet door.

During the day it remains concealed in a closet in the dining or any other room. At night it enables the room to be converted into a sleeping room and provides a full size double bed.

The head is hinged to the back of the door and when closing up the foot is raised and the whole bed is literally stood on its head against the back of the door. Such a bed is a space saver because the bed rests when not in use upright in a shallow closet, and the room may be used for other purposes.

THE present quite common custom of equipping the bathroom with something in the way of shelves and drawers for taking care of the bathroom linen and other articles is ordinarily a very commendable one, for it undoubtedly results in a saving of a great many steps to the housewife. The little bathroom illustrated herewith possesses equipment of this kind, in the nature of two corner cabinets, as well as a wall medicine case.

The cabinets are located against the one outside wall of the room—one in each corner. Each is 27 in. wide by about 13 in. in maximum extension from the wall, and reaches to a height above the floor of about 39 in. In the top of each are two small drawers, and in the bottom are two roomy shelves equipped with a pair of simply paneled doors, while the tops of the cabinets constitute commodious counter-shelves. And above each a small casement window is placed to give the needed light.

The medicine case is recessed in between studdings just above the wash bowl. It contains three shallow shelves, and its door is paneled with a mirror.

This bathroom, it should be further observed, has tile flooring and a tile wainscot, while the tub is also tiled in and the fixtures are of good quality. The woodwork, including the built-in features, is finished in white enamel.

That there is much opportunity for the extensive use of built-in furniture in the bath room is plainly indicated by the suggestions in this illustration. Linen cabinets and medicine chest may be mentioned

Better Building Methods

With Prices of Material and Labor High It Is Necessary to Take Advantage of Every Possible Way to Cut Down Waste in Production of Every Kind

By LAWRENCE S. KEIR

Part II

IN STONEWORK, as in other building operations, much is gained by giving the men plenty of room and a good footing. Too often masons are cramped in a narrow space by a bank of excavated earth directly back of them and stones piled upon the bank are continually rolling down and getting under foot. Such conditions make it difficult for the mason tenders to pass by without disturbing the masons. Time used in leveling up the ground and in building the scaffolds two or three planks wider is well spent.

Inclines are in most cases preferable to ladders but they must be as gradual as conditions will permit, and where ladders are used, they should be of the two-way type. The traffic on all scaffolds, ladders and runways should be kept moving in one direction to avoid confusion.

When inclines are used instead of ladders, wheelbarrows may take the place of hods, and this alone is a big advantage. If ladders must be used, they should be built to make climbing easy; the rungs should not be too far apart. Toting stone, brick and mortar up a ladder all day is hard work under the best conditions. A tired man can't do the work, nor take the interest he otherwise would.

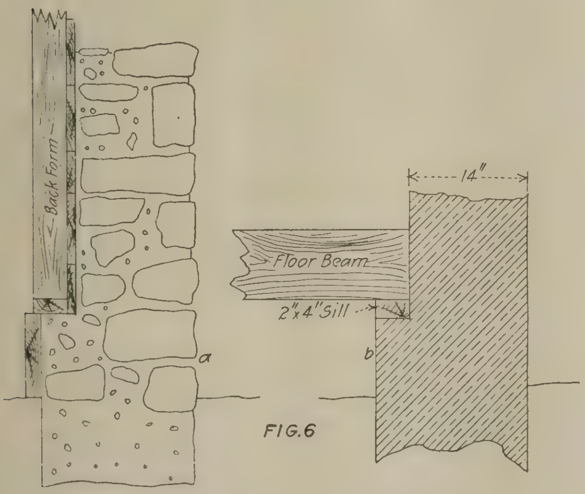


FIG. 6

Light Wall for Residences

As soon as the work gets to the point where the men cannot get at the work easily, raise the scaffold. Usually this can be done along one stretch while the masons are working somewhere else.

Crowding too many masons on a rubble wall reduces the individual output. Each mason has not the space for free movement and he is also more or less put to the necessity of finding or trimming a stone for each certain place. If he has a fair stretch of wall to himself, on the other hand, and keeps a good portion of the wall covered with a bed of mortar, almost any stone he may pick up will fit in somewhere. Picking up stones, trying them and throwing them down again does not build stone walls. It only wastes time.

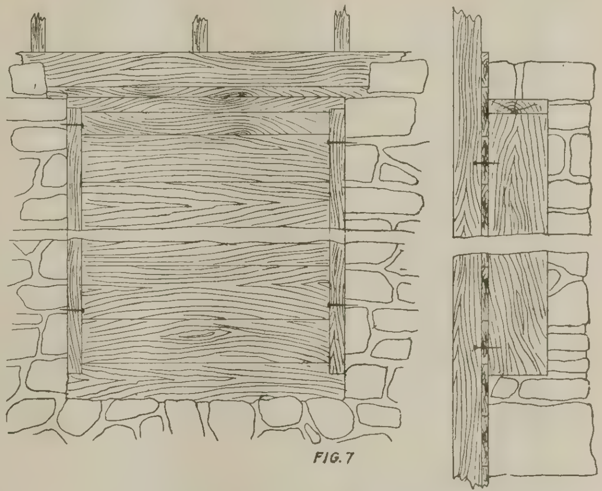


FIG. 7

Plank Frames for Wall Openings

In cases where the wall is not required to carry much load, time and money can be saved by a liberal use of cement mortar, because it is unnecessary then to get an exact fit with each stone. A stone of the approximate shape and size is all that is required, and the mortar fills the voids.

Keep a good supply of stone of varying sizes within reach of the masons. The greatest headway is made with stones as large as one man can handle easily. A small stone takes nearly as long to lay as a larger one. Boulders found on the lot are often drilled and split, but it is foolish to waste time drilling a stone that can be split with a heavy hammer. Where it is seen that a stone will require some hammer dressing, do this work before it is put on the scaffold. It is much easier to work on the ground when it is possible.

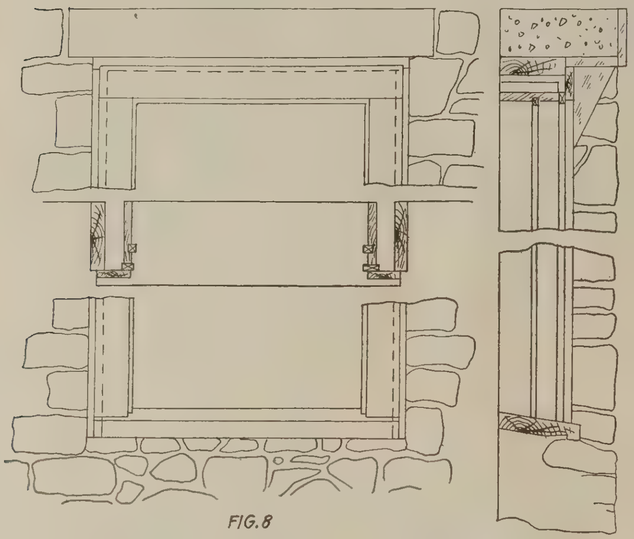


FIG.8

Window Frames in Place

An easily and quickly laid wall for small residence work or where a light load is to be carried is shown in Fig. 6. A temporary form is erected on a line with the inner face of the wall. Plank frames for openings are tacked against the forms (Fig. 7). The face of the wall is laid with field stones just as picked up in the field and the backing is filled in with small stones and chips bedded well in mortar and forming a strong concrete. Care should be taken to secure good corner bonding and frequent bonds should be made through the wall by use of through stones or by lapping.

The wall shown is only 14 in. thick and is a saving of material over what would be required for a wall laid up with stone on both faces because an 18-in. wall is the smallest that can be worked to advantage on two face work, owing to the difficulty of proper bonding.

In Fig. 8 is shown a window frame in place against the false frames and the form in place to receive the concrete lintel. The shaded block supports the lintel form. Fig. 9 shows a corner pier under way, and Fig. 10 shows a middle pier.

If good sand is available, this wall can be laid with good results in a mortar composed of 1 part Portland cement, 1 part lime paste and 6 parts of sand. Use only fresh mortar and have it well mixed. Avoid too much or too little water.

On account of the cost of brick, the quantity used and the wages connected with handling them, brickwork deserves to have more attention given to details than is usually the case.

It is not unusual, for example, to see brick dumped in a heap somewhere on the premises in much the same manner as crushed stone for concrete. Then the tenders dump them in another heap, breaking a few more in each handling.

Bricks can easily be stacked when brought to the job and kept in a neat pile that can be protected from sun and rain. Sometimes bricks are stacked to form a sort of bin and this bin filled up with bricks that are thrown in hap-hazard. When the outside bricks are removed the bricks in the middle come rolling out. When they are stacked on edge, they lie better and are not so easily broken. A shed covering has the advantage of doing away with repeated handling of boards, paper or canvas. In any event the bricks should be covered so that they do not vary in degree of dampness.

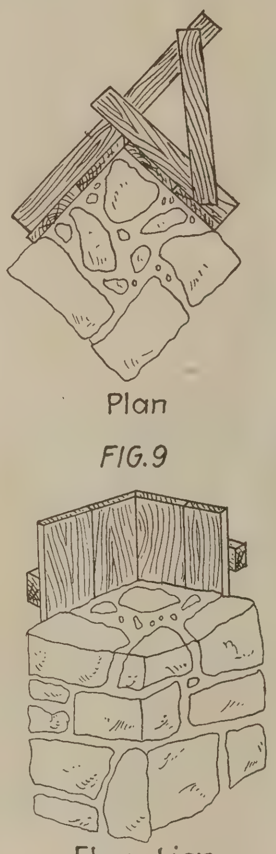


FIG.9

Corner Pier

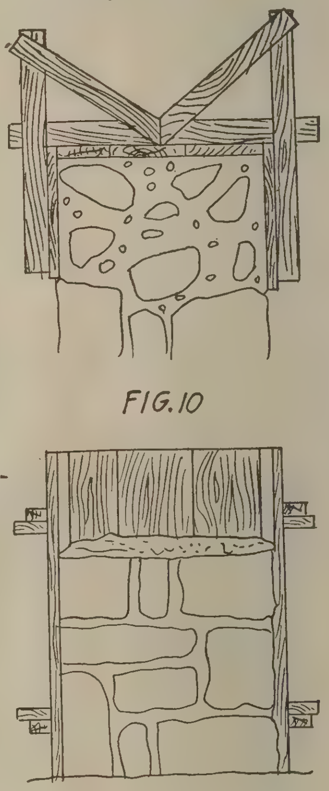
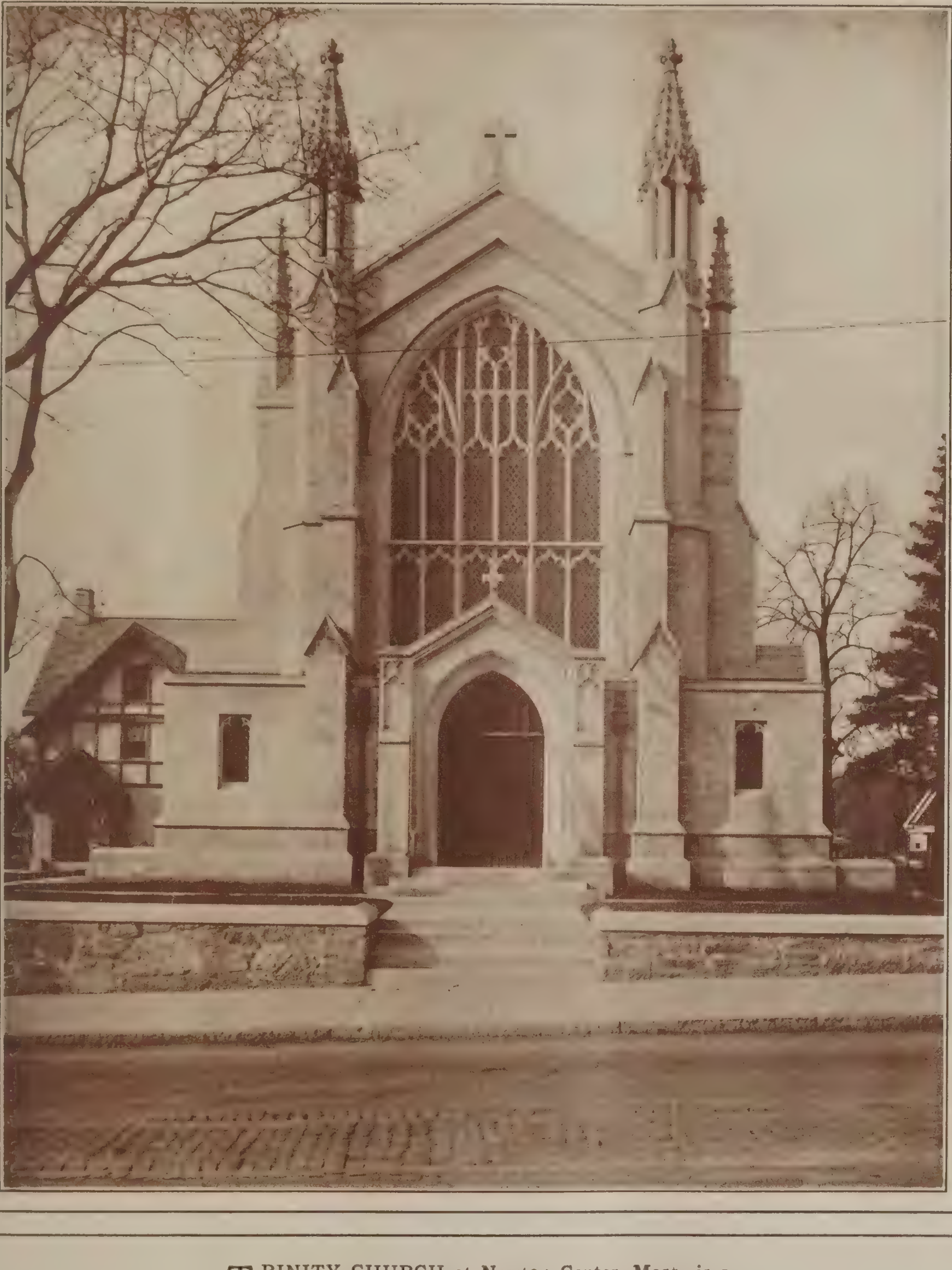
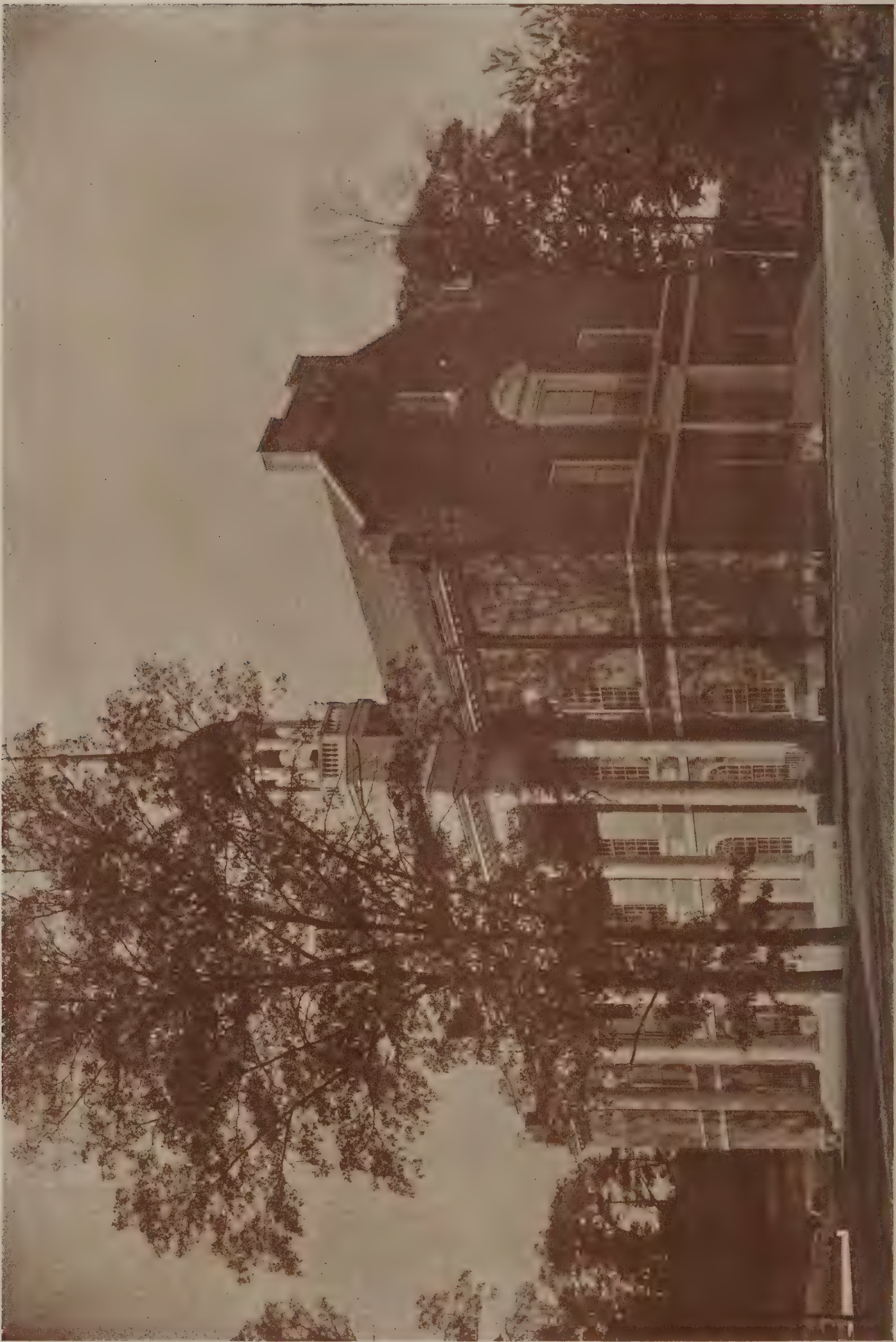


FIG.10

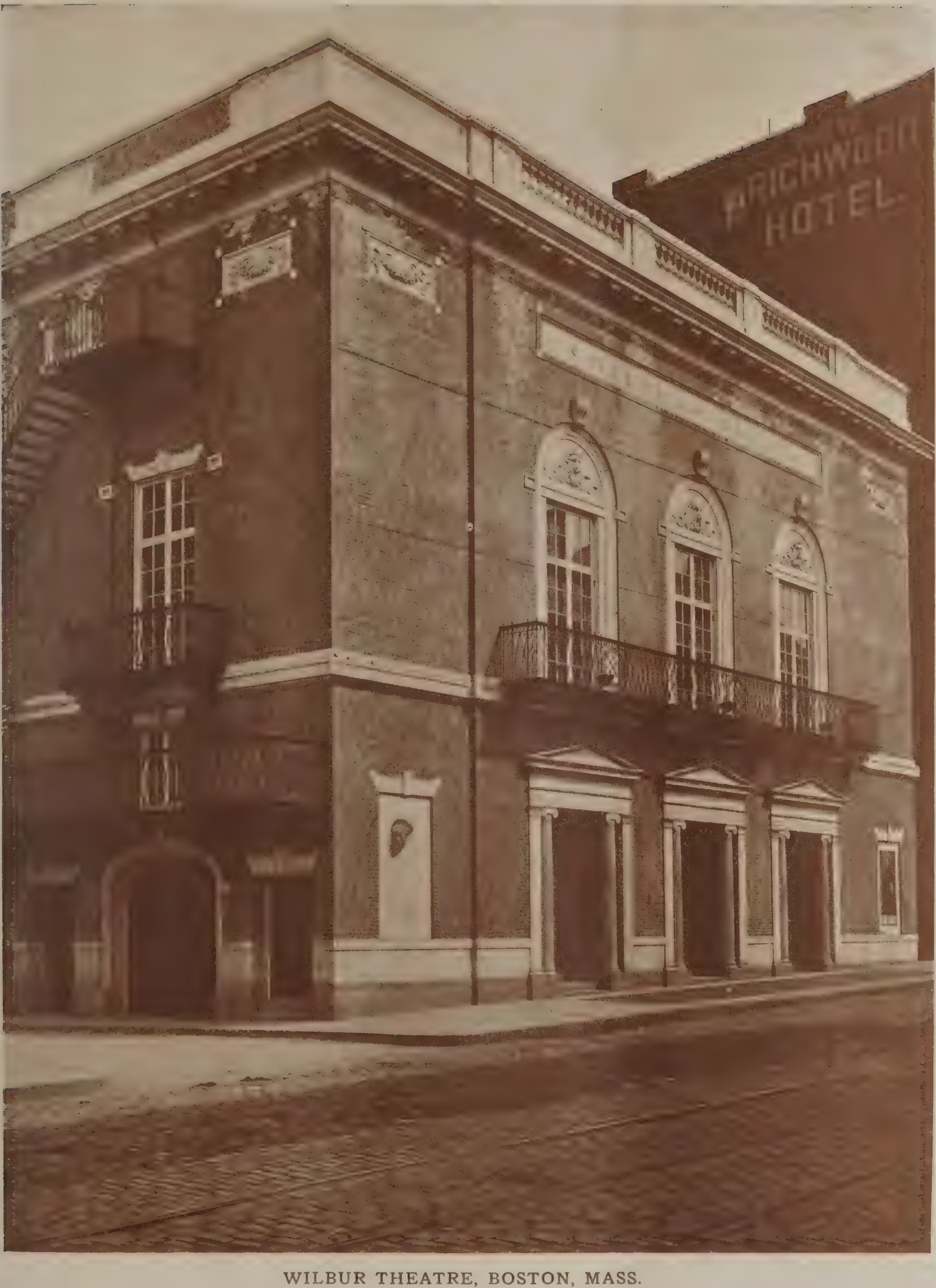
Center Pier



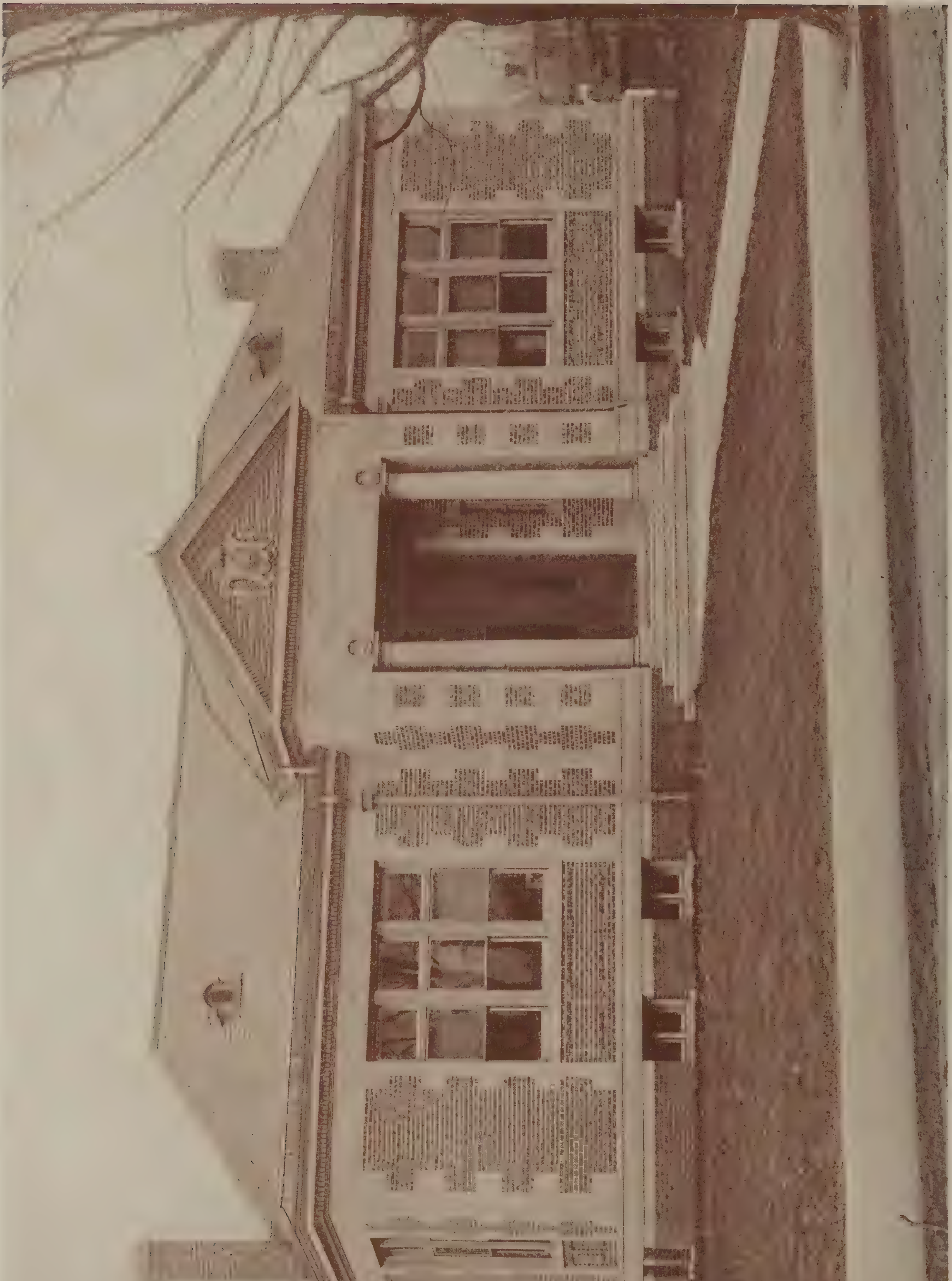
TRINITY CHURCH at Newton Center, Mass., is a pleasing bit of stonework. The architecture is the work of George W. Chickering. It is of the Gothic type and represents a dignified example of ecclesiastical design for a small frontage.



TOWN HALL, WESTON, MASS.
Bigelow & Wadsworth, Architects



WILBUR THEATRE, BOSTON, MASS.
C. H. Blackall, Architect



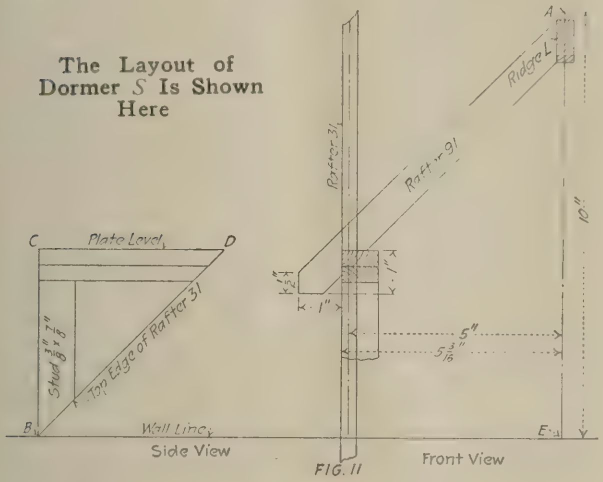
PUBLIC LIBRARY, INDIAN ORCHARD, MASS.
Wm. Jno. Donohue, Architect

How to Lay Out a Frame Roof

By Richard M. Van Gaasbeek

Part III

THE only problem that might trouble the mechanic in laying out dormer *R* is the method of finding the plate level. The dormer is formed by the intersection of valleys *D* and *E* and the sides of the dormer are built up on rafters Nos. 70 and 71, making a total width of 6⅜ in. Lay in the common rafter as shown in Fig. 10. The facia is the same as for the main roof, the projection is 1 in. and the plancher level to plate level is 1 in. Develop the plate level in the front view and measure from the point *A*, corresponding to the intersections of the center lines on valley *D*, the run of ridge *O* taken from the layout. This will give the wall line. To the left of the front view, lay in the top edge of rafter No. 95, and project the plate level over from the front view carrying it out to the edge of the wall line. The lines *B C D* then give the exact dimensions of the studs and frame work fastened on the top edge of rafter No. 95 to close in the side of the dormer. The length of the ridge will be the distance from *A* to *E* less a deduction of one-half the diagonal of valley *D*. Through this center point miter the corner on either side so as to fit into the intersections of valleys *D* and *E*.



The Layout of Dormer *S* Is Shown Here

FIG. 11

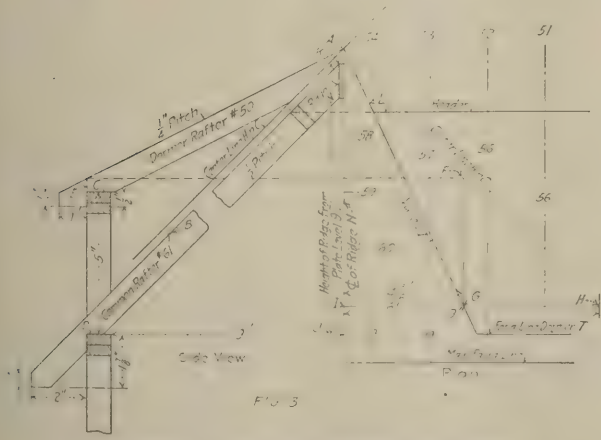
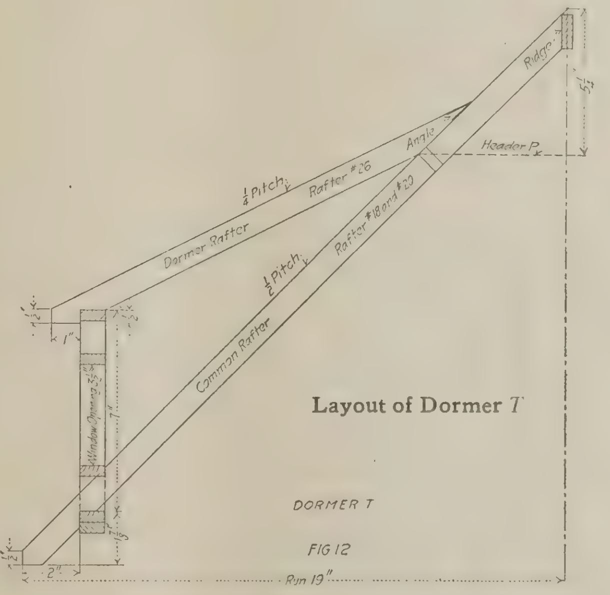


Fig. 13

Dormer *U* Is Laid Out in This Way



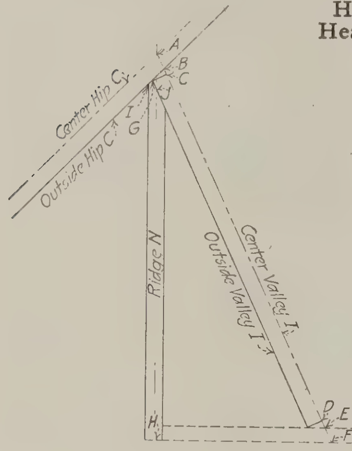
Layout of Dormer *T*

DORMER T

FIG 12

Dormer *S* is laid out similar to dormer *R* and is formed by the intersections of valleys *G* and *H*. The sides of the dormers are built up on rafters Nos. 30 and 31, making the total width between walls 10⅜ in. Lay in the common rafter, as shown in Fig. 11, to the same specifications as for dormer *R*. Develop the plate level as shown in the front view and measure from the point *A*, corresponding to the intersections of the center lines on valley *G*, the run of ridge *L*, taken from the layout, which will give the wall line. To the left of the front view, lay in the top edge of rafter No. 31 and project the plate level over from the front view, carrying it out to the edge of the wall line. Then the lines *B C D* give the exact dimensions of the studs and frame work fastened on the top edge of rafter No. 31 to close in the side of the dormer. The length of the ridge will be the distance from *A* to *E* less a deduction of one-half the diagonal of valley *G*. Through this center point, miter the corner on either side so as to fit into the intersections of valleys *G* and *H*.

For Dormer *T* lay in an elevation of rafter No. 18 (Fig. 12) using the same specifications as those already used and mark the position of header *P*, taking the run from the layout. Rafters Nos. 18 and 20 run to the plate and rafters No. 98 stop at the header. From this header project the elevation of the dormer rafters No. 26, the pitch being 6 in. in 1 ft. or ¼ pitch, the facia ½ in., projection 1 in. and the plancher level to plate level ½ in. With the layouts of the rafters thus developed the measured height of the dormer plate above the main plate is 7 in. as shown in Fig. 12. The walls of the dormer are built up on rafters Nos. 18 and 20. The only new problem that may puzzle the mechanic is the bevel of the dormer rafter to fit on top of the main rafter roof. Lay the bevel square on the layout, set to the required angle, and apply on the top edge of the rafter and mark.



Development of Ridge *N* at the Left

FIG. 15

Hopper Cut on Ends of Header *Q* to Fit Against Valley *I*

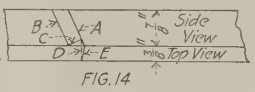


FIG. 14

The most interesting and difficult problem of the entire roof is the framing of dormer U. This gives an intersection of two roofs of different pitch, the gable ½ pitch and the dormer ¼ pitch, and the question is, to find the exact position of valley *I*. Lay in the top edge of the side of the hip *C*, right and left, radiating from the intersection of hip *C*, valley *I* and ridge *N* (Fig. 13). Develop the side view first on the left hand side. Lay in the full width of common rafter No. 61, using the same specification as for the rafters of the main roof. The top edge of the common rafter is in alinement with the center line of the hip and, looking at it from the side, the top edge of the common rafter is lower than the hip owing to the fact that the corner of the hip is to be removed in order to bring the top edge of the common and center line of the hip in alinement.

To find the relative position of the top edge of the common rafter, use the rule for backing as shown at *B* (Fig. 13). Measure on a level line, from the top edge, one-half the thickness of the stock used and gauge a line through the point obtained. Next, lay in the side view of the dormer rafter No. 50, radiating from the same central point, using the same specifications as for dormer *T*. The distance from *C* to *D* will then give the height of the dormer plate above the main plate level. The problem is now to locate the position of valley *I*, so that the center line will intersect with the top edge of dormer rafter No. 50. Valley *I* stops against common rafter No. 61, corresponding to the wall line, and by locating the relative position on the dormer rafter and projecting the point over until it intersects rafter No. 61, the point of intersection is obtained of valley *I* and rafter No. 61.

Continue the wall line of the dormer up as at *E* (Fig. 13) until it intersects the top edge. Project this point over on the plan on the right hand side of the layout until it intersects the top edge of the side view of rafter No. 61 at *F*. At right angles project the same point until it intersects the plan of rafter No. 61 as at *G*. Connect this point with the intersection of the ridge and hip *C* as at *A*. Then *A G* is the run of the valley *I* on the center line. *I H* is the run of common rafter 61, and *G H* will give the height above the wall plate and the run from *H*. Thus the exact intersection of rafter No. 61 and valley *I* can be determined. *J K* gives the exact height of ridge *N* above the main plate level. The header is placed so as to receive the bottom end of the dormer rafters. Project the edge of the header over until it intersects valley *I* and by measuring from these two points between valleys *I* on the lay-

Development of Valley *I*

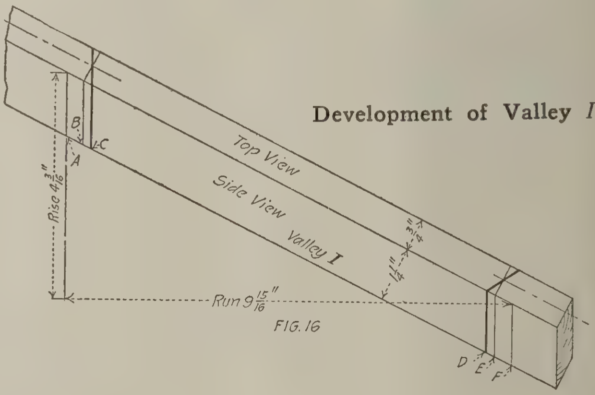


FIG. 16

out the exact length of the header can be determined. From this extreme length must be deducted one-half the diagonal distance of the valley. Bevel each end as shown at *L* (Fig. 13) on the side of the header. The end cut is a hopper butt joint and not square and can be developed as shown in Fig. 14. *A* is bevel *L* taken from Fig. 13 laid out on the side of the stock and *A B* is the thickness of the stock used. Square the line *B* over until it intersects the line *A* as at *C*. Project this intersection up until it cuts the top edge and square across the top edge as at *D*. Connect the points thus obtained, cutting on the line *A* on the side of the stock and the line *E* on the top edge, which will give a perfect fit of the header on either end against the valley *I*.

LIST OF RAFTERS WITH RUN AND LENGTHS

No. of Rafters	Quantity of Rafters Pairs	Runs in.	Lengths in.	Remarks
1	5	2	2 10/12	Jack Rafters
2	4	4	5 8/12	" "
3	3½	6	8 6/12	" "
4	3½	8	11 4/12	" "
5	1	10	14 2/12	Common Rafters
6	1	10	14 2/12	" "
7	1	10	14 2/12	" "
8	1	10	14 2/12	" "
9	1	2	2 10/12	Jack Rafters
10	1	4	5 8/12	" "
11	1	6	8 6/12	" "
12	1	8	11 4/12	" "
13	1	10	14 2/12	" "
14	1	12	17	" "
15	1	14	19 10/12	" "
16	1	16	22 8/12	" "
17	1	18	25 6/12	" "
18	1	19	26 11/12	Common Rafters
19	38	2	2 10/12	Jack Rafters
20	20	19	26 11/12	Common Rafters
21	1	18	25 6/12	Jack Rafters
22	1	16	22 8/12	" "
23	1	14	19 10/12	" "
24	1	12	17	" "
25	1	10	14 2/12	" "
26	9	12 3/4	17 4/12	" "
27	5	7 1/16	9 11/12	Cripple Rafters
28	1	3	4 3/12	Jack Rafters
29	1	5	7 1/12	" "
30	1	7	9 11/12	" "
31	1	7	9 11/12	" "
32	1	5	7 1/12	" "
33	1	3	4 3/12	" "
34	1	4 3/4	6	Cripple Rafters
35	1	2 5/16	3	" "
36	1	6 1/2	8 8/12	" "
37	3	7 1/16	9 11/12	" "
38	1	9	12 9/12	Jack Rafters
39	1	7	9 11/12	" "
40	1	5	7 1/12	" "
41	1	3	4 3/12	" "
42	1	1 3/8	1 7/12	" "
43	1	2 5/16	3	" "
44	1	3 1/4	4 5/12	" "
45	1	4 3/16	5 10/12	" "
46	1	2 3/4	3 2/12	Cripple Rafters
47	1	4 3/4	6	" "
48	1	6 3/4	8 10/12	" "
49	1	8 3/4	11 8/12	" "
50	9	10 1/8	14 4/12	Jack Rafters
51	1	9 1/8	12 11/12	Cripple Rafters
52	1	7 1/8	10 1/12	" "
53	1	5 1/8	7 3/12	" "
54	1	3 1/8	4 5/12	" "
55	1	4 5/16	5 10/12	" "
56	13	7 7/8	10 3/12	Jack Rafters
57	1	4 5/16	5 10/12	Cripple Rafters
58	1	1 3/8	7 7/12	Jack Rafters
59	1	2 5/16	3	" "
60	1	3 1/4	4 5/12	" "
61	1	4 3/16	5 10/12	" "
62	1	9	12 9/12	" "
63	1	7	9 11/12	" "
64	1	5	7 1/12	" "
65	1	3	4 3/12	" "
66	1	2	2 10/12	Cripple Rafters
67	3	4	5 8/12	" "
68	1	2	2 10/12	Jack Rafters
69	1	4	5 8/12	" "
70	1	6	8 6/12	" "
71	1	6	8 6/12	" "
72	1	4	5 8/12	Cripple Rafters
73	1	2	2 10/12	" "
74	1	6	8 6/12	" "
75	1	10	14 2/12	" "
76	1	14	19 10/12	" "
77	1	16	22 8/12	" "
78	1	12	17	" "
79	1	8	11 4/12	" "
80	1	4	5 8/12	" "
81	1	2	2 10/12	Jack Rafters
82	1	4	5 8/12	" "
83	1	6	8 6/12	" "
84	1	8	11 4/12	" "
85	1	10	14 2/12	" "
86	1	10	14 2/12	Common Rafters
87	1	8	11 4/12	Jack Rafters
88	1	6	8 6/12	" "
89	1	4	5 8/12	" "
90	1	2	2 10/12	" "
91	4	6 1/4	8 8/12	Common Rafters
92	2	6 1/4	8 8/12	Jack Rafters
93	2	4 1/4	5 10/12	" "
94	2	2 1/4	3	" "
95	2	4 3/16	5 10/12	Common Rafters
96	2	4 3/16	5 10/12	" "
97	2	3	4 3/12	Jack Rafters
98	9	5 1/4	7 3/12	" "
A	2	14 1/8	17 3/8	Hip Rafters
B	1	24	28 7/16	Pt. hip, pt. valley
C	1	26 13/16	32 7/8	Pt. hip, pt. valley
D	1	12 5/8	15 1/2	Valley Rafters
E	1	9 7/8	12 1/16	" "
F	2	27	33 1/8	Hip Rafters
G	1	19 1/4	29 11/16	Valley Rafters
H	1	14 1/4	17 1/2	" "
I	2	9 15/16	10 7/8	" "
J	1	14	14	Ridge
K	1	18	18	"
L	1	10	10	"
M	1	9	9	"
N	1	9	9	"
O	1	7	7	"
P	1	16	16	Header
Q	1	32	32	"

To layout ridge *N* lay in the center lines of hip *C* and valley *I* as shown in Fig. 15. The distance *A H* is the run of the ridge taken from the lay out. From the center lines measure one-half the thickness of the hip and valley and lay in the outside lines of the hip and valley, then the distance *G H* is the exact length of the ridge; *I* gives the bevel against hip *C;* and *J* gives the bevel against the side of valley *I*. In laying out the valley *I* first determine the rise in in. per ft. and measure the run of the rafter *A G* (Fig. 13) and the rise *I G*.

$$\frac{\text{Rise}}{\text{Run}} \times \frac{12}{1} = \text{Rise in in. per ft.}$$

$$\frac{4\ 3/16}{9\ 15/16} \times \frac{12}{1} = 5\,\frac{2}{10}\ \text{in. per ft. rise.}$$

Set the fence and the square so that 5.2″ rise on the tongue and 12″ run on the blade coincide, marking on the tongue for all plumb cuts and on the blade for all level cuts. Take the run of the rafter from the development as shown in Fig. 13, measuring from the outside of the common rafter No. 61 to the intersection of hip *C*, ridge *N* and valley *I*. With the fence thus set produce the first plumb line to the extreme right *F* (Fig. 16). Measure from this line on a level line the run of the rafter and produce another plumb line *A*, the extreme length. From the extreme length must be deducted one-half the diagonal of hip *C*, *A B* (Fig. 15). Measure in from line *A* (Fig. 16) this distance and produce a plumb line; square across the top edge and locate the center point. To find the bevel for a proper fit against hip *C*, square the point *G* (Fig. 15), across until it cuts the center line of valley *I* as at *C*. Measure the distance *B C*, and transfer this distance on the layout (Fig. 16) measuring from the line *B* and produce another plumb line. Connect through the center as shown on the top view (Fig. 16). To complete the bottom, deduct the diagonal distance of common rafter No. 61 as *E F* (Fig. 15).

From the extreme length, as at *F* (Fig. 16), deduct this distance and square across the top edge and locate the center point. Square the outside edge of the rafter across until it cuts the center line as at *D* (Fig. 15) and measure the distance *D E*. From *E* (Fig. 16) produce another plumb line equal to *D E* (Fig. 15) and connect through the center as shown on the top view (Fig. 16). Cut on the angle on the plumb cut *D* for the bottom cut and on the angle on the plumb cut *C* for the top cut.

The most important rafters of the roof have now been considered and the following tables have been prepared to assist the reader in checking up his work. Measure the runs on the plan and see if they correspond with measurements listed, lay the rafter out with the steel square and check up the length before making deductions with the lengths listed in the tables. These measurements are all taken on a center line and are extreme lengths without any deductions.

The woodworking department of Pratt Institute is glad to have builders, architects or owners submit irregular, unusual roof plans from which a model can be built. In this way the proportions and construction are studied before the actual job is started.

Heating Systems Analyzed

Continuing From Our April Issue the Discussion on Heating the Small House, There is Here Presented An Account of Vapor-Vacuum-Pressure and Hot Water Systems and Their Adaptability to Various Types of Buildings

By W R. Eaton

THE vapor-vacuum-pressure system is adapted to the usual home, and to larger buildings. It can be used wherever steam can be used, although it may not always be advisable.

Water at sea level must be brought to 212 degrees Fahrenheit before it will boil. On a high mountain top it begins to boil before that heat is reached. The difference is due to the fact that there is less atmospheric pressure on the height. Obviously, if the regular atmospheric pressure could be reduced or removed, water would boil anywhere at a lesser temperature than 212 degrees.

By watching a kettle, you will observe that vapor arises long before the water actually boils. It is hot vapor—not as intensely hot as live steam, but containing a formidable amount of heat. It will warm the air noticeably.

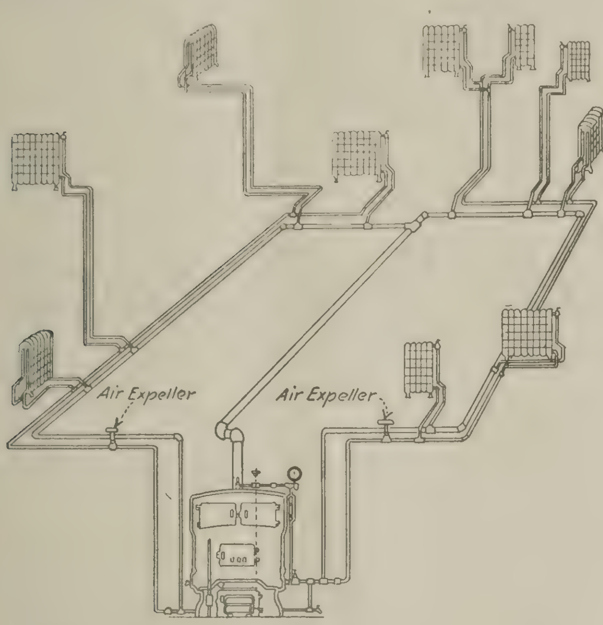
The vapor-vacuum-pressure heating system is based on these two natural facts. By a simple method all air-pressure is removed from the whole system of boiler, pipes and radiators.

Owing to this vacuum, vapor circulates through the house as soon as the boiler begins to heat the water. In mild days this vapor-circulation is quite sufficient to warm the house.

When steam is made it circulates quickly because it has no resistance from air in the pipes and radiators and this again makes fuel economy. The steam is carried to the tops of the radiators, while the air and water, formed when the steam condenses, are conducted away through small return pipes at the bottom. This method eliminates air valves entirely. In addition, the vacuum eliminates water-hammer and all noise incident to the encounter of steam with air. Noiselessness is one of the valuable features of this system.

Radiators and piping for this system are no larger than those required for steam. It is exceedingly easy to operate, requiring little attention. Heat is retained after the fires are banked for the night, and increased heat circulates quickly in the morning as soon as the drafts are opened.

It develops practically the same heat as steam at 212 deg. F., with a coal-consumption corresponding to a temperature less than even the 160 degrees required for hot water heating. It stands between these two systems in point of initial cost of installation.



Typical Layout for Vapor-Vacuum-Pressure System

Hot Water Heating

Hot water heating systems are adapted more to office and other buildings than homes.

This system requires larger pipes and radiators than steam, but the hot water circulates with a lesser degree of heat (160 degrees as against 212 degrees for steam). This makes it an investment that pays dividends in saved fuel.

The water circulates as soon as it is sufficiently heated to expand. This expansion drives it from the boiler through the pipes and into the radiators, which are practically the same in appearance as steam equipment.

The circulation is continual because as the water cools, it passes through return pipes to the boiler to be heated again.

Hot water heating begins as soon as fuel generates effective heat. It has power. It delivers a large percentage of burned coal in actual useful warmth. It is as easy to operate as steam. Correct boiler rating, adequate pipe and radiator area, contact of large heating surface with the fire and provisions for unimpeded circulation are imperative.

Boiler Is Heart of the Plant

As in steam heating, the boiler is the heart of these types of heating plant. Fuel-economy and fuel-results depend on its design and construction.

A hot water heating system would be considered very expensive for some types of homes, but in some cases the greater economy of fuel actually overshadows the first cost.

The rated ability of the boiler is based on tests, evaporating so many pounds of water into steam in a certain given number of hours with so many pounds of coal. It is obvious that an economical boiler is one that can make a large amount of steam with a small consumption of coal in a given time. To do this, a boiler must be designed and constructed most scientifically, and an important part of the design is the correct proportion of heating surface to grate area.

Ratings are technically expressed in square feet of radiation. These indicate the power of the boiler, because they show the amount of pipes and radiators to which the boiler must furnish an adequate warmth.

Figuring a Foundation

A HOUSE foundation that is to be 1 foot thick, 10 feet high, 25 feet wide and 40 feet long would be figured as 1 x 10 x 23 = 230 for the short wall and 1 x 10 x 40 = 400 for the long wall. The reason for using 23 as the building length of the short wall is that if the long wall is figured the full length, its thickness will of course lessen the length of the short wall one foot at each end. As there are two short walls and two long ones, the totals of 230 and 400 would be doubled, giving 1260 cubic feet, from which should be deducted space occupied by doors and windows. If there are two doors measuring 7 x 3, and six windows measuring 3 x 2, there would be a deduction of: 7 x 3 x 1 x 2 = 42 plus 3 x 2 x 1 x 6 = 36; a total of 78 cubic feet. In estimating height of walls, of course, the distance that the footings or foundations go into the ground must be taken into account, and if the footings are thicker than the above-ground wall—as they sometimes are—it is better to calculate their volume separately.

Where concrete has a curved surface, such as a road, the mean, or average, thickness can be taken.

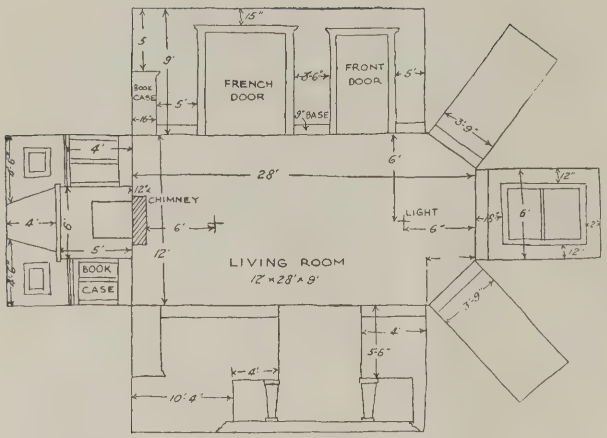


Fig. 1. Rough Pencil Sketch Made on the Job

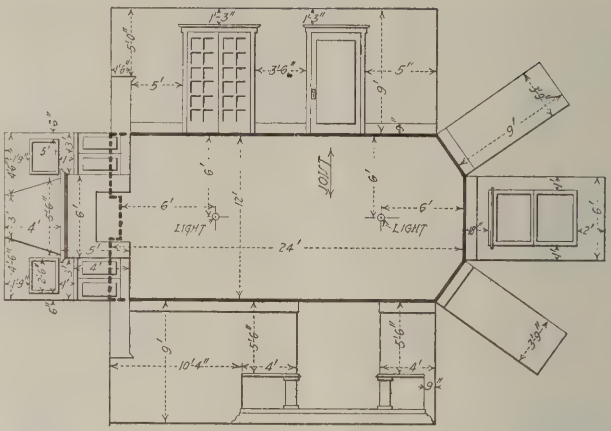


Fig. 2. Drawing Worked Up from Pencil Sketch

Remodeling with Wallboard

Hints on Making Estimates, Lining Up Prospects and Getting Business

By L. H. HARVEY

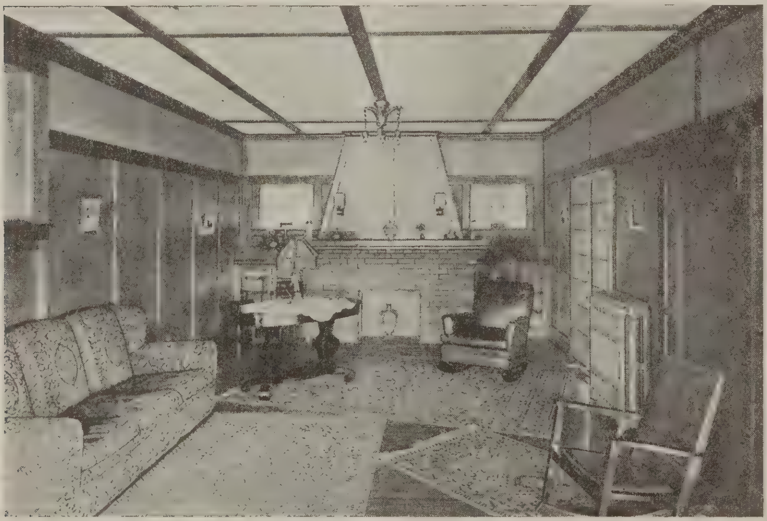
IT is evident that the builder who is familiar with the possibilities of wallboard, from both a practical and decorative standpoint, is prepared to do a good business in repair and remodeling. Wallboard work is more plentiful than ever for the builder who understands how to develop orders for this kind of reconstruction.

A steady and paying amount of such business is within the grasp of every builder who makes a concerted effort for this branch of repair and remodeling construction. While quite a little wallboarding has already come to most carpenter-contractors in the natural course of events, it is only a small part of the wallboard jobs that can be had by the builder who puts forth a systematic effort for this work.

Contractors who have become wallboard specialists have found it comparatively easy to obtain plenty of wallboard work by making themselves familiar with those facts about wallboarding that an owner usually wants to get straight in his mind before giving the word to go ahead. Wallboarding is now in greater demand, but there are also more builders who are looking for such work than in any past season. The successful builder, therefore, will be, the one who is prepared to make an intelligent drive for wallboard business. He should be able to tell what a wallboard job will cost. He should know how quickly it can be done. Finally, he should be familiar with the decorative possibilities of wallboard so that he can give the owner a good idea of what the finished result will be.

To figure the cost of the work not only must the number of square feet be known, but also the decorative trim, mouldings, baseboard, headers or extra studding are required. These figures can not be obtained accurately without a sketch of the panel design of the finished room. Laying out a panel design may seem rather difficult but it is simple enough if the scheme outlined here is followed.

Fig. 1 is a rough pencil outline show-



Interior of Remodeled Room

ing the dimensions of the room that are required to lay out the panel design. This sketch can be made at the job on any handy piece of paper. This rough plan is really only a memorandum and is made from the floor dimensions which are usually the same as the ceiling. Facing north, draw the north wall, putting in all windows, doors or other openings and irregularities. Do the same plan for the other walls indicating the dimensions in the same manner.

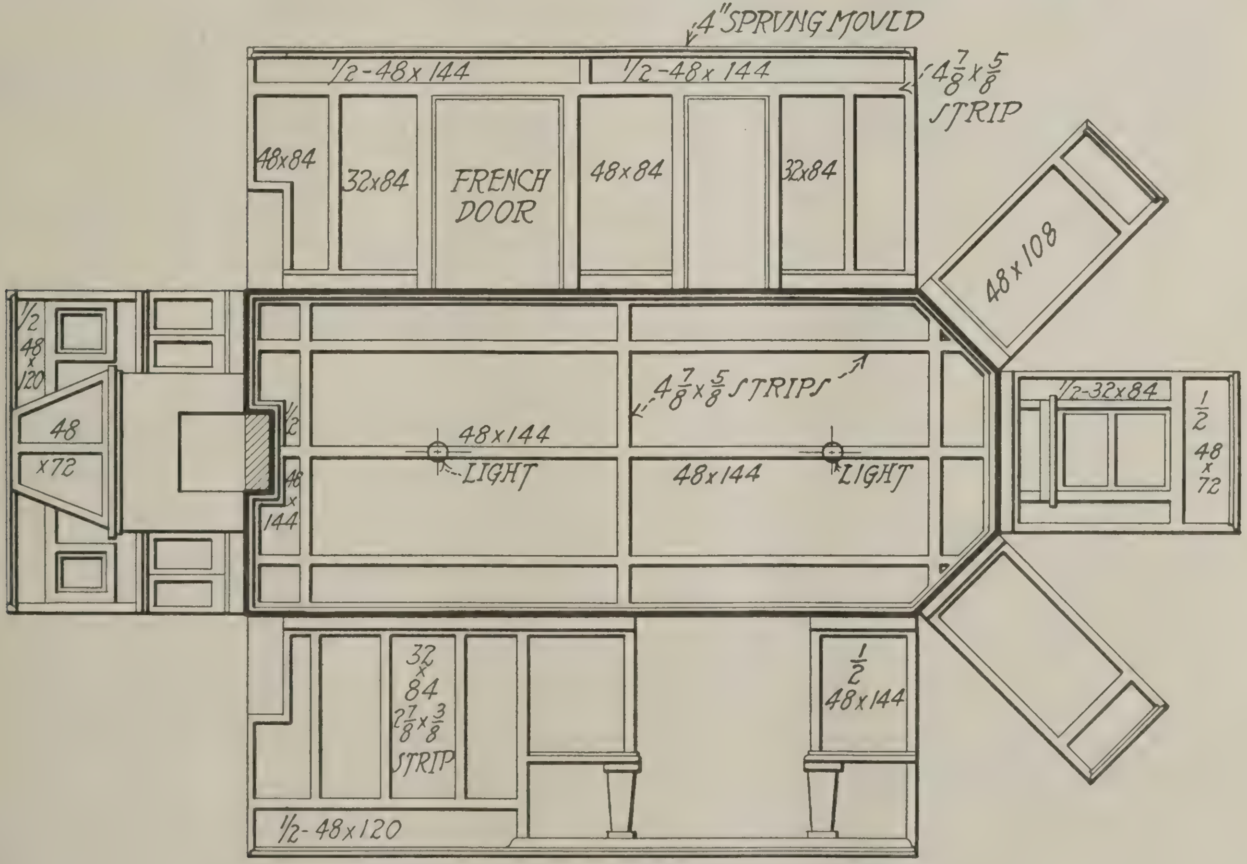
With this information the panel plan can be worked out at the first favorable opportunity. This has been done in Fig. 2, using a scale of one-quarter inch to the foot. The panel arrangement is then sketched in (Fig. 4), showing the quantity and size of the wallboard panels needed and giving the basis for figuring the lineal feet of trim and mouldings necessary.

Each builder's experience will enable him to figure the labor charge. The amount and cost of paint and stain that will be needed is estimated. An estimate that should be within at least 5 per cent. of the ultimate cost of the job will be obtained in this way.

How this is done is shown by comparing the model estimate with the panel plan worked out in Fig. 4. These are not present day prices but will serve as an example. When presenting such an estimate to the

ESTIMATE FOR REMODELING LIVING ROOM WITH WALLBOARD.

Wallboard	Feet	
Eight 32x84″ panels	149 1/3	
Three 48x72″ panels	72	
Two 48x84″ panels	56	
Two 48x108″ panels	72	
Two 48x120″ panels	80	
Nine 48x144″ panels	432	
	961 1/3 @ 4c. a foot	$38.44
Trim		
400 feet 4⅞″ by ⅝″ @ $48 per M		19.20
90 feet of 4″ sprung moulding at $52 per M		4.68
60 feet baseboard 9″ @ $60 per M		3.60
Nails		
4 lbs. flat head @ 10c. per lb		.40
2 lbs. wire brads @ 15c. per lb		.30
Paint		
Flat cream for ceiling and frieze, 2 gallons for two-coat work @ $3.75 per gallon		7.50
One coat of flat tan, one gallon @ $3.75		3.75
Two quarts glazing or blending liquid @ $4.00 per gallon		2.00
Mottling colors (burnt sienna, raw sienna and yellow ochre) at 50c. each		1.50
Labor		
Three days carpenter labor @ $5.50 per day		16.50
Day and a half painting @ $4.50 per day		6.75
Total		$104.62



Final Drawing Which Accompanies the Proposal to the Client prospect show him an attractive, practical panel scheme for his rooms. This will go a long way toward convincing him that the work should be done. This has been done in Fig. 5, which shows the completed room carried out according to the panel plan and estimate. Many a house owner does not realize how wallboard can be used in his particular rooms, but when you present a panel scheme and exact estimate he sees just how the work can be done and his confidence rises not only in wallboard, but in the man who is to put it up. It is not necessary to be a draftsman or have any special ability at drawing to make these panel plans and estimates.

Some contractors endeavor to estimate wallboarding by taking the total area of a room and give a price on the basis of so much per foot.

Such a method does not do justice to any of the parties involved. On many jobs it is too high. On others, where more preliminary preparation is necessary or unforeseen conditions have to be provided for, the contractor loses money.

As an example, suppose a 12x12 ceiling is to be covered with wallboard. It has 144 sq. ft., which would cost on the area basis $28, if figured at 20 cents per sq. ft. When laid out according to a panel plan the material cost is, say, $9.96, the labor, $10 and the paint, $3, or a total of $22.96, which is $5.04 less than what the job would cost on the area basis. In this case plain stripping was used, but if a beamed ceiling had been called for the cost would easily have risen beyond the $28 figure. The owner has a better impression that you are giving him a square price if you present a detailed estimate than if you base your figure on a square-foot basis. Moreover, the builder is not taking any chances himself.

How to Get Prospects Interested

To get prospects interested to the point where they will want a figure on their rooms, make up a list of possible users. That list should contain the names of house owners who have never put their attics into a serviceable condition and who have old houses that could be brought up-to-date by a thorough room restoration. There are also business places in town, stores that need new ceilings, window backgrounds, built-in offices, partitions, or other extra rooms for clerical work, displays, or storage purposes.

Manufacturers will furnish timely folders and other helps that would be of interest to the men on the list. These folders should be placed in their hands, either by mail, or during a personal talk. A few minutes spent daily in talking to members on the list keeps up interest and furnishes new prospects. Manufacturers will furnish upon request a set of actual photographs of good wallboard jobs. These always arouse a keener interest if shown at the time the panel plan and estimate are presented.

There is a lot of remodeling work for the carpenter-contractor who goes after the business in the right way and makes his proposition a little more interesting to the prospect than his competitor.

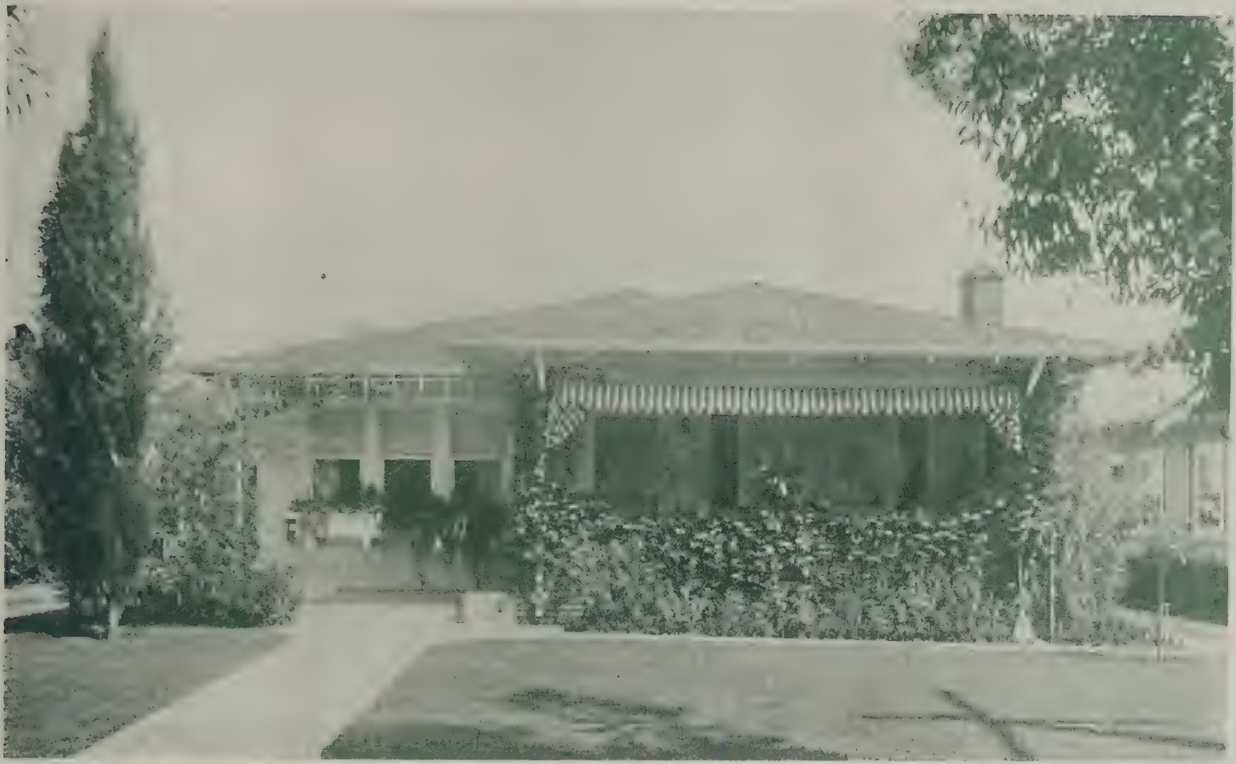
An Economically Planned Bungalow

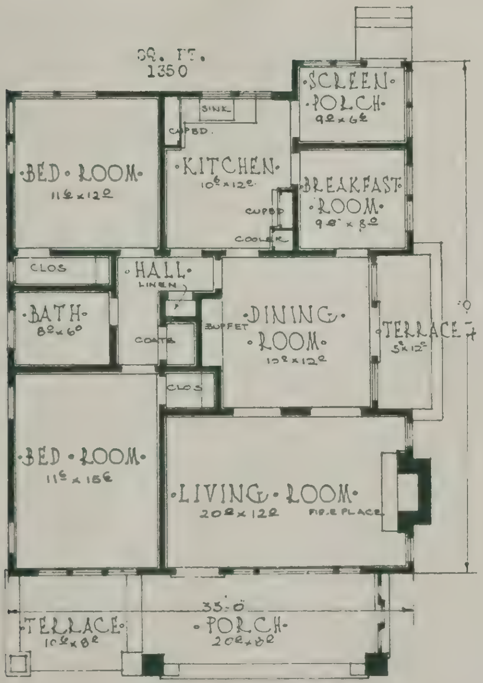
(*Continued from page* 25)

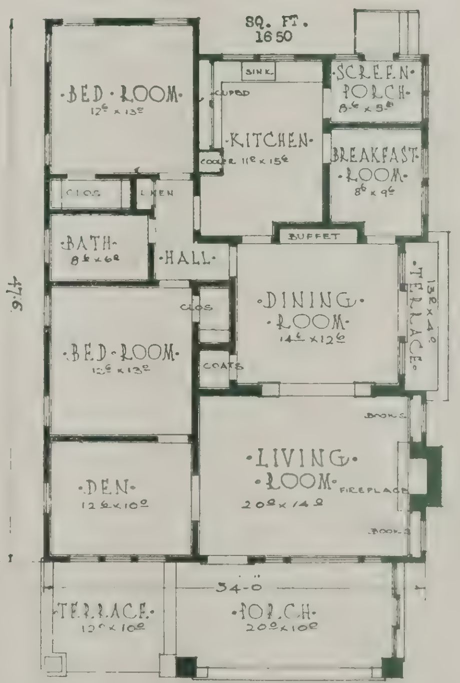
cellent wardrobe, each of the other two sleeping rooms possesses a roomy closet, in the hall is a linen closet, off one corner of the living room is a closet for wraps, the dining room contains a good buffet, and the kitchen is equipped with a draught cooler-closet and much drawer and shelf room, besides the customary sink.

The interior woodwork is of pine throughout. In the living room and dining room it is finished in light gray enamel, and elsewhere in white paint and enamel. Hardwood flooring is used in the living room, dining room and front bed room, as well as in the hall, and the walls of these three rooms are papered, while those of the two other bed rooms are tinted. The walls of the bath room and kitchen are finished to a height of about six feet with a smooth, hard plaster coat which is enameled like the woodwork, and their floors are of pine covered with linoleum. The living-room fireplace has a mantel of brick and wood, attractively designed.

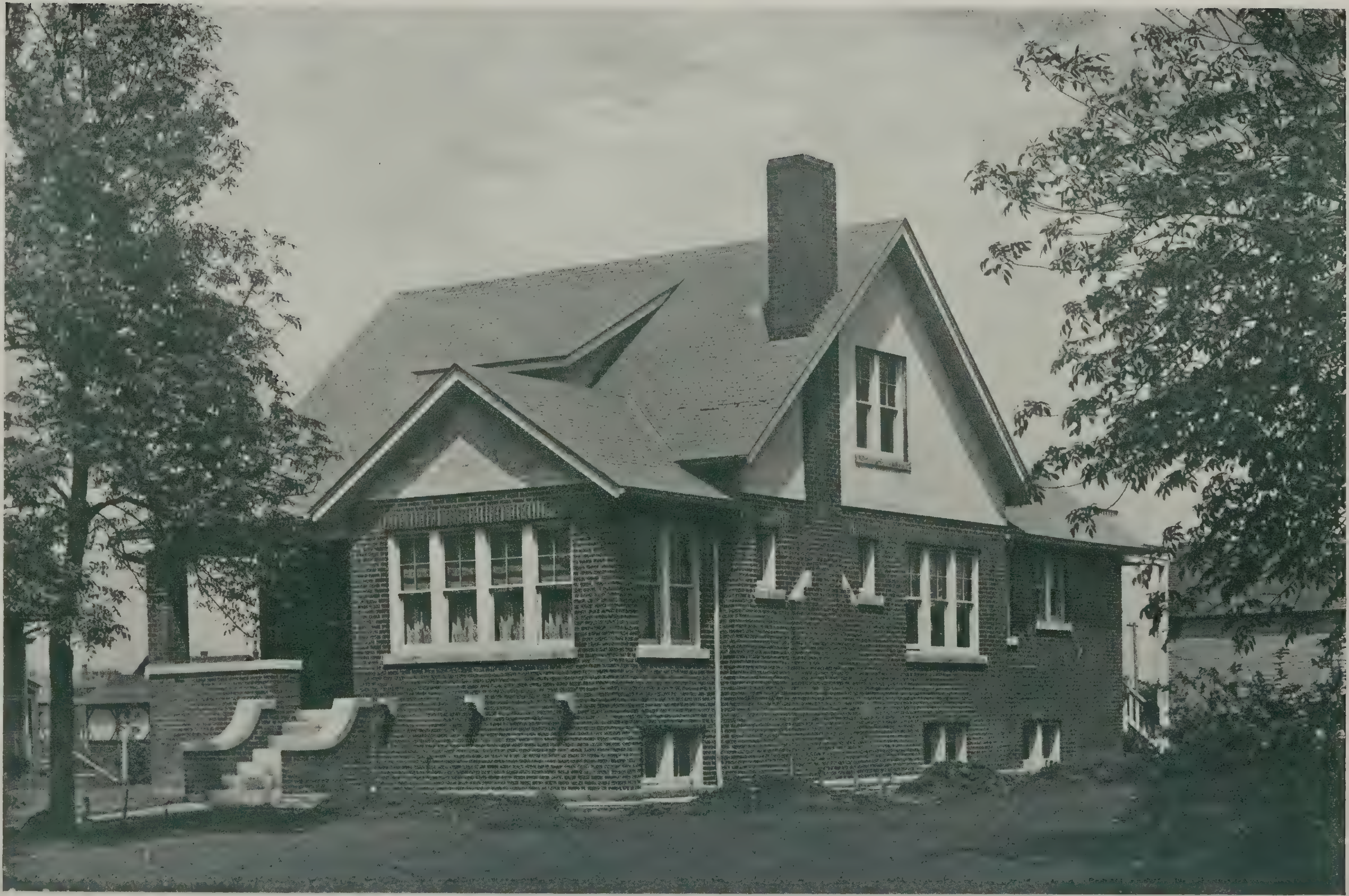
The house has no basement, although one might have been very easily provided, with a stairway thereto off the rear entry porch. The heating plant consists of built-in gas radiators. The bungalow is located in Long Beach, Cal., and was designed by W. E. Allen, of Los Angeles.



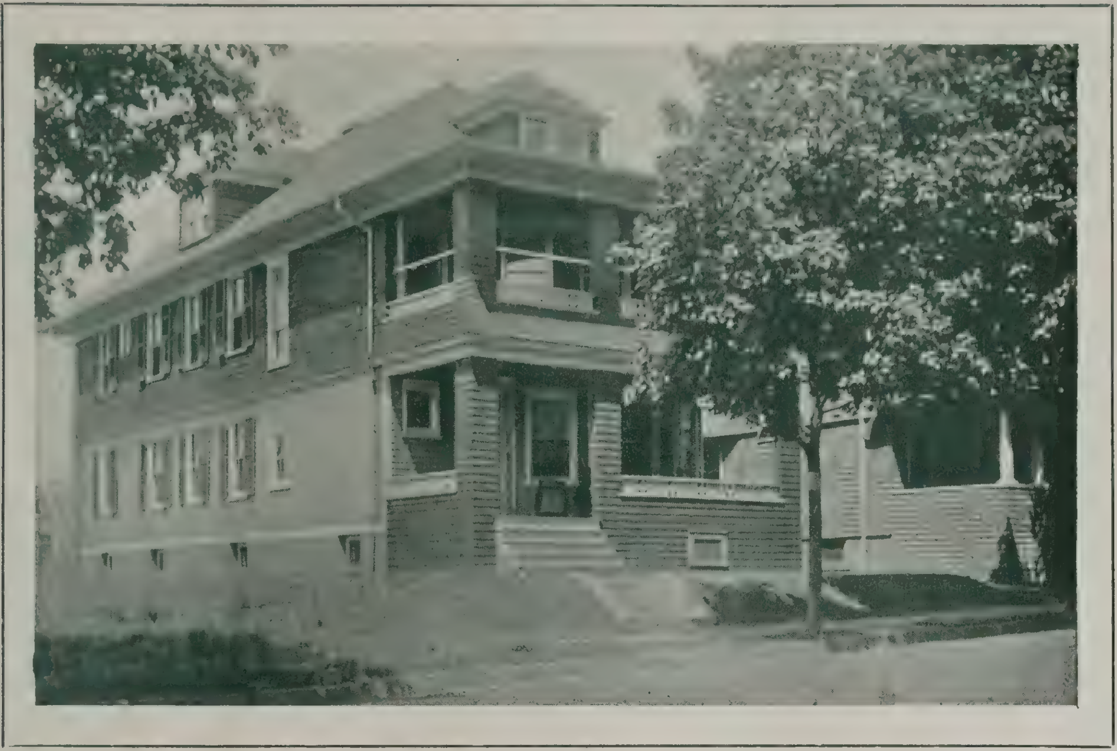


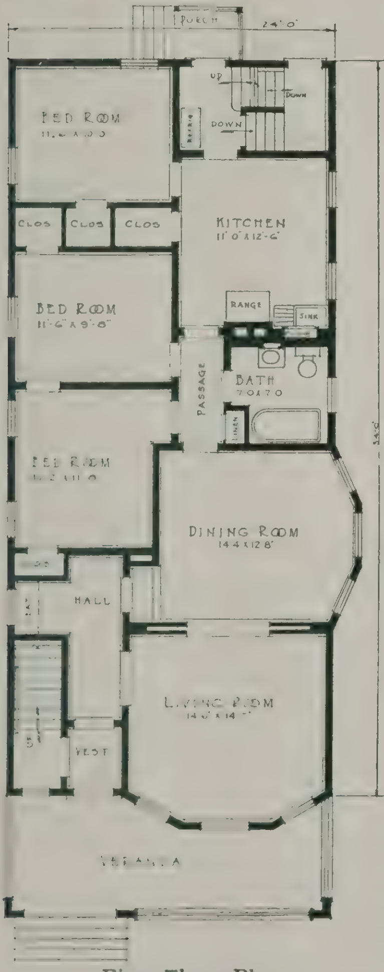


EITHER of the above plans may be used with this roomy little bungalow, and either one will be found unusually compact and complete. The placing of the walk at one side provides an expanse of lawn that forms a pleasant feature. For a modest subject this little home has been given thoughtful care and reveals a pride of ownership in its well-kept grounds. The fine array of plant life here is a valuable artistic asset. Imagine it without these and see how bare it would look for all its modern conveniences.



BRICK COTTAGE OF H. A. SCHROEDER,
Elmhurst, Ill.





First Floor Plan

THIS two-family house at Paterson, N. J., was designed by Charles H. Benjamin.

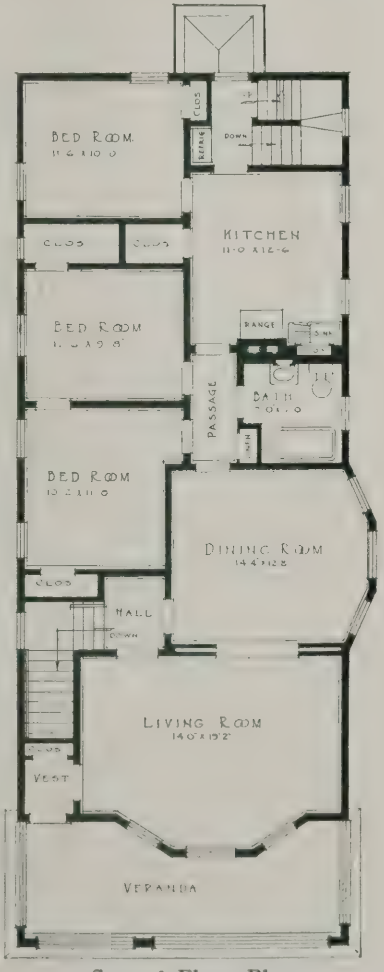
The foundation walls are of concrete, with stucco finish above grade.

Exterior walls are of 2"x4" studs, sheathed and finished with clapboards on lower portion and shingled above. Roof is covered with slate. Gutters and leaders are of galvanized iron. The chimney is of brick, with fire clay flue linings.

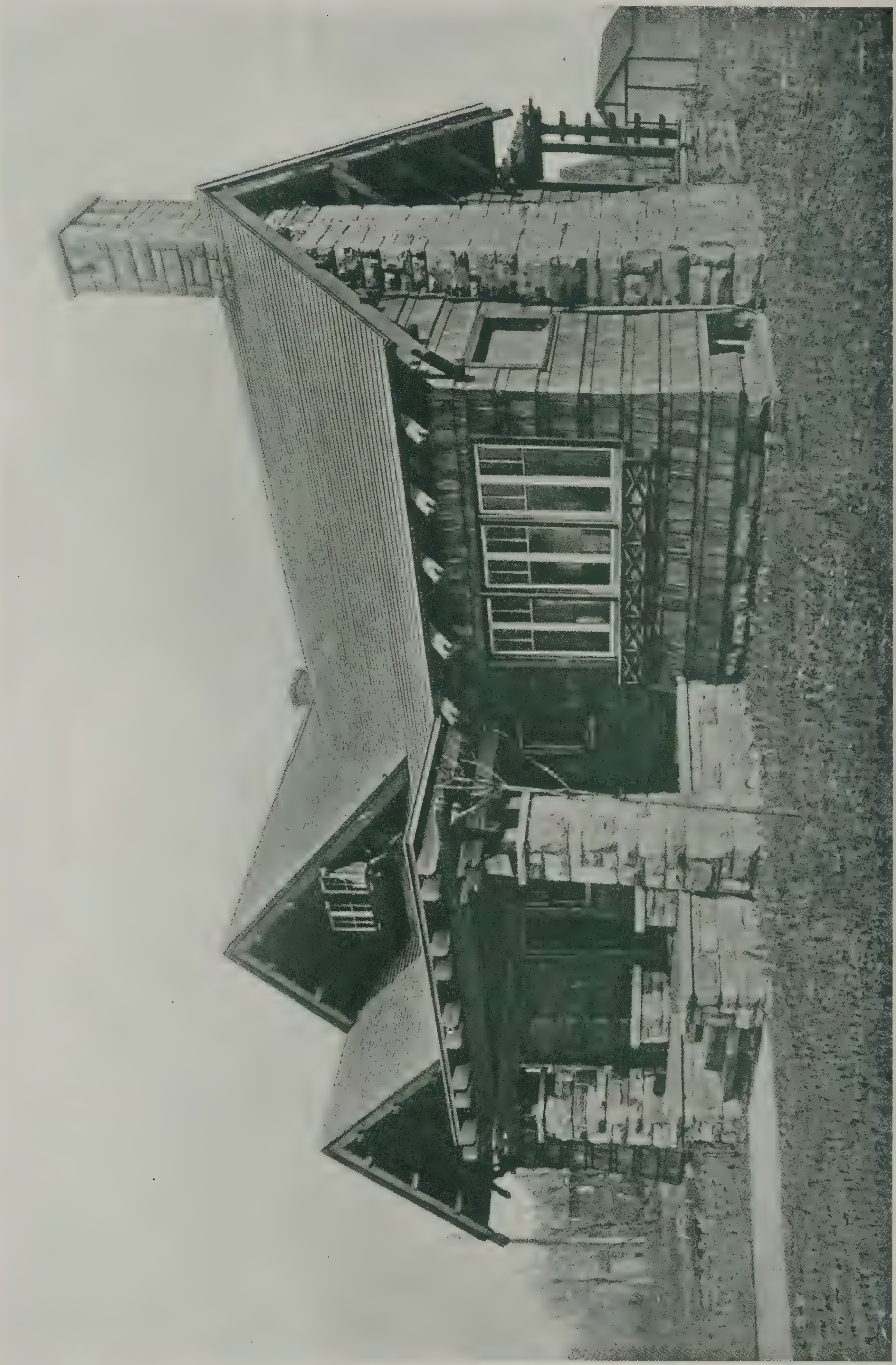
All the rooms have chestnut trim with natural finish excepting living room in second story, which has birch trim, mahogany finished. All doors are of birch, with two panels, excepting one bed room closet door in each story, which is glazed with mirror, full height.

Floors are of comb-grained yellow pine. Dining room walls are paneled 5'x6" high and finished with plate shelf. Walls of living room, dining room and hall of each story are decorated with paper; all other rooms are finished with flat paint. Each story contains six large rooms and bath, with ample closet space.

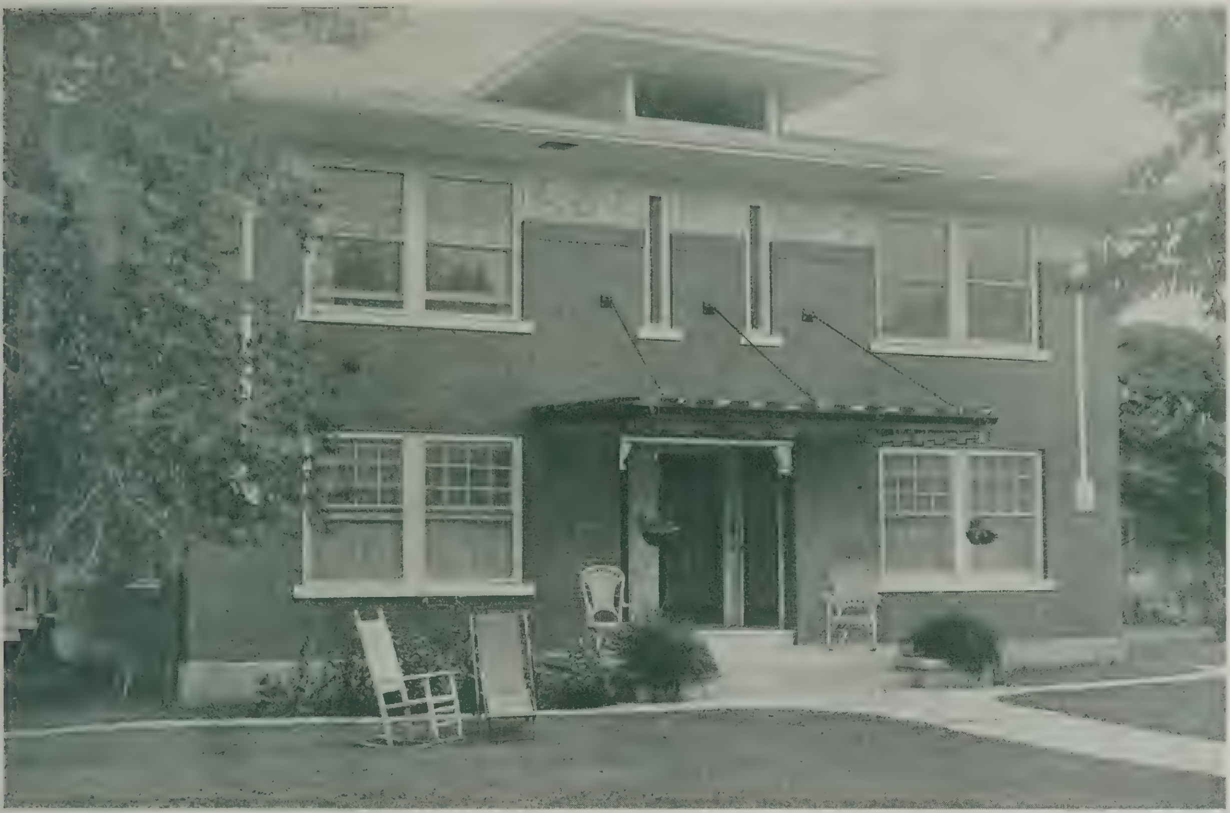
All plumbing fixtures are of modern type, with hot and cold water connections. Wash trays and separate steam heaters are provided in the basement.

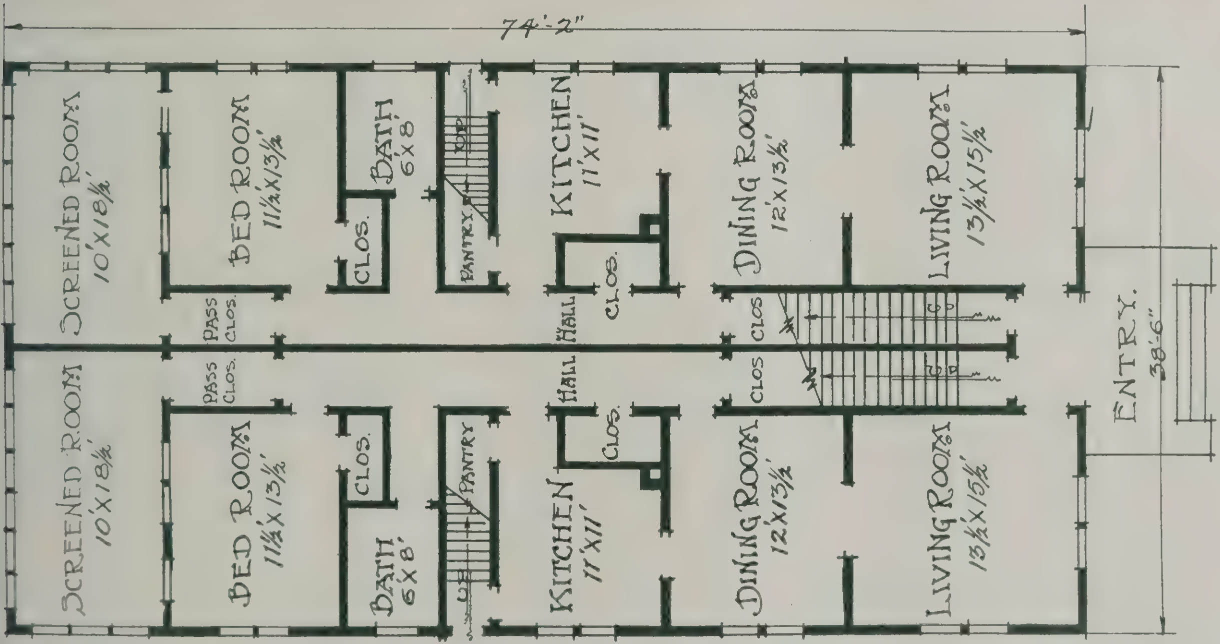


Second Floor Plan

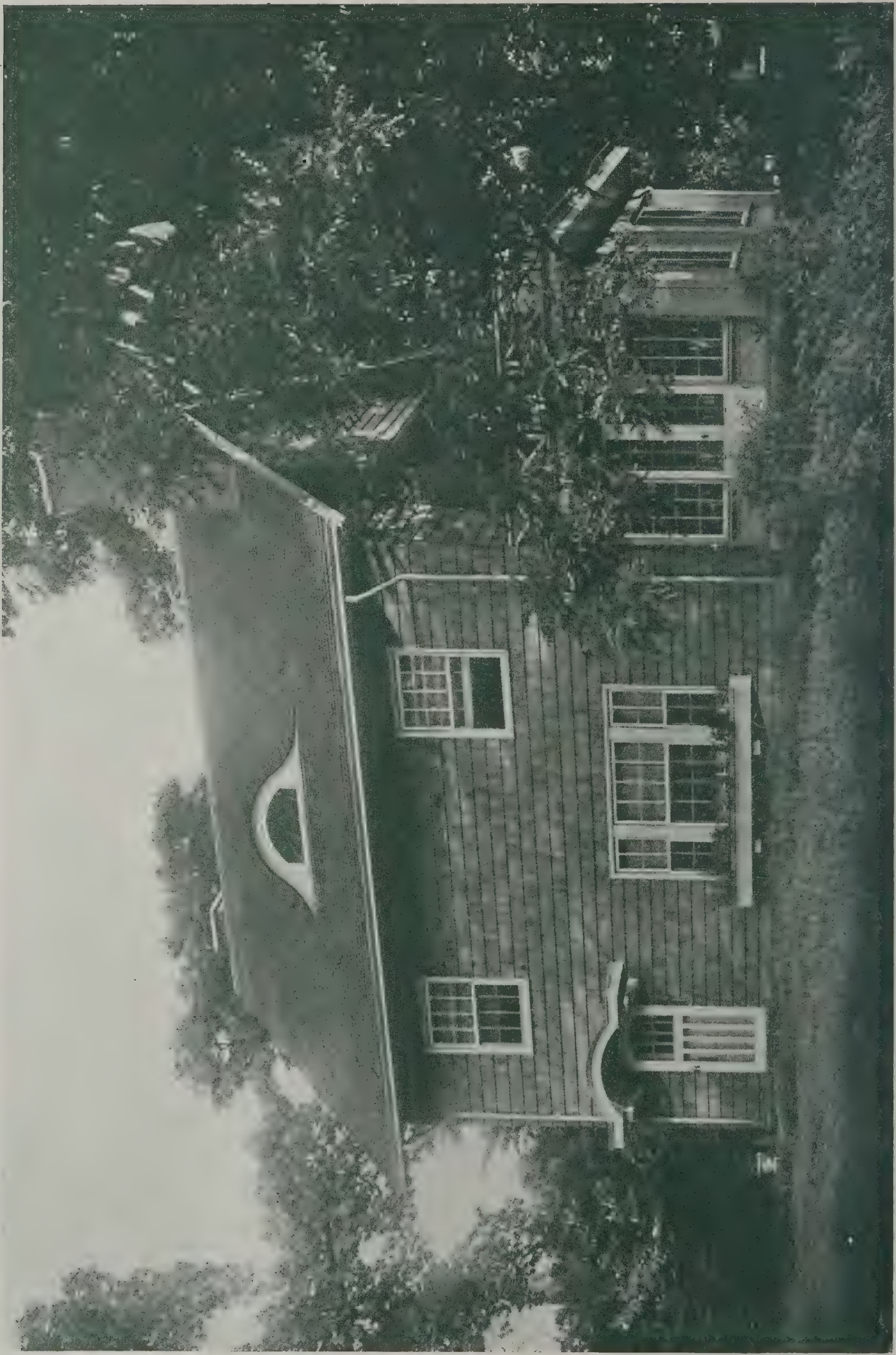


HOUSE AT CLEVELAND HEIGHTS, OHIO
Arthur N. Oviatt, Architect

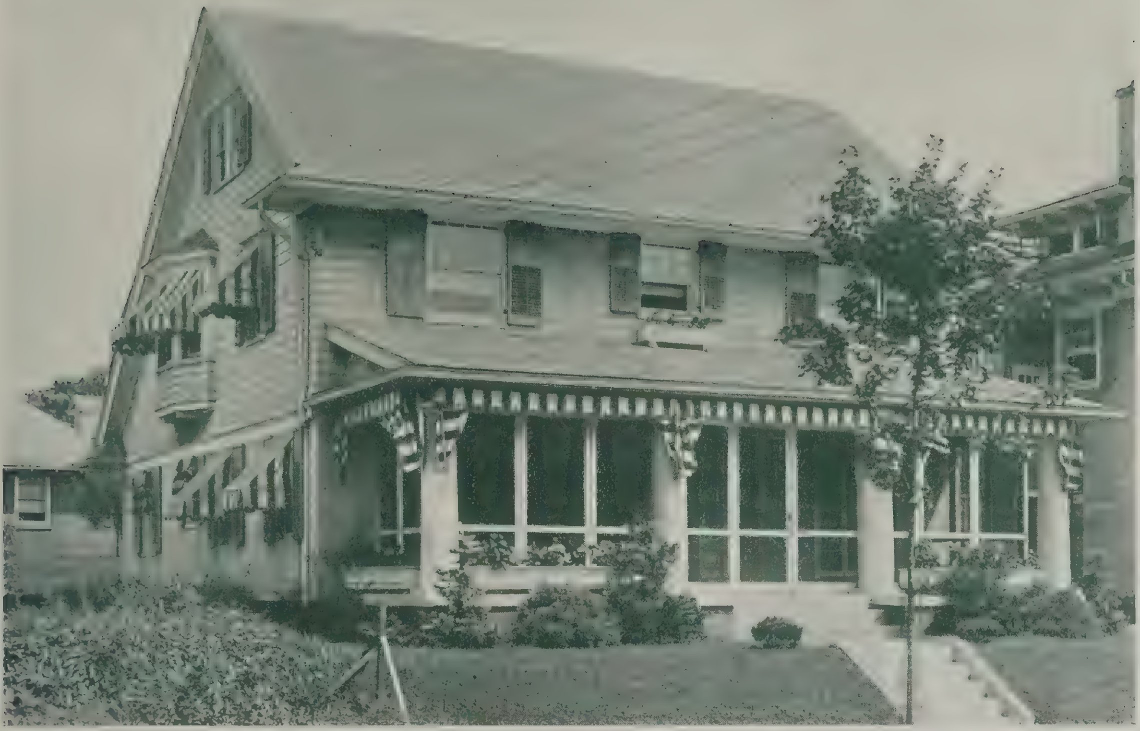


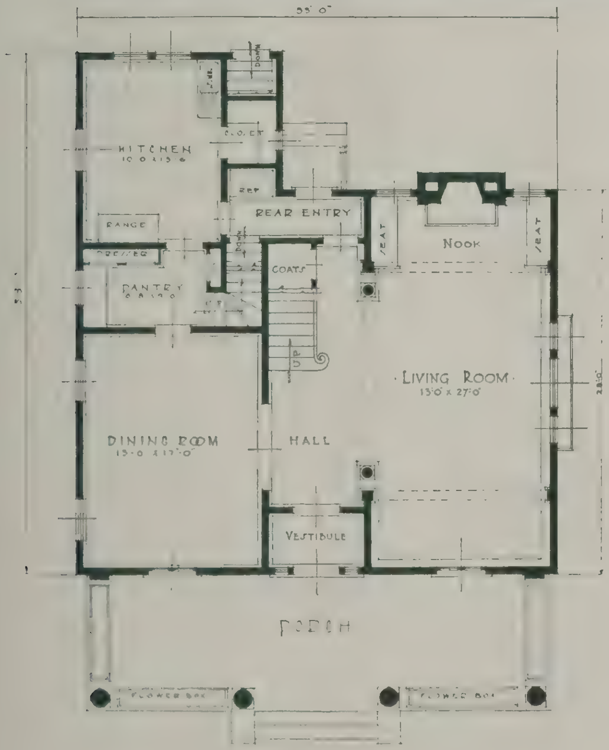


MULTI-FAMILY HOUSES are in great demand today. The present example accommodates four families. Each apartment is fully exposed to the light, and its simple plan meets the necessary requirements. Similar types are a desirable improvement in every small community.

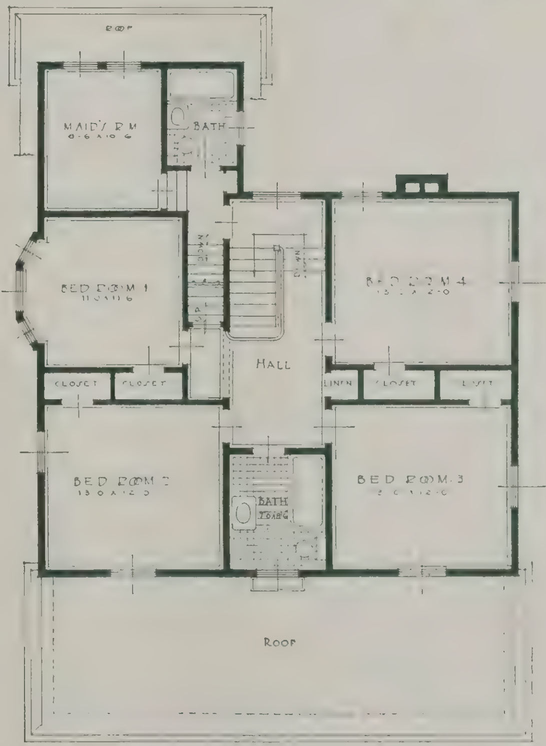


HOUSE OF GEORGE DITTMAN, CINCINNATI, OHIO
L. C. Burroughs, Architect



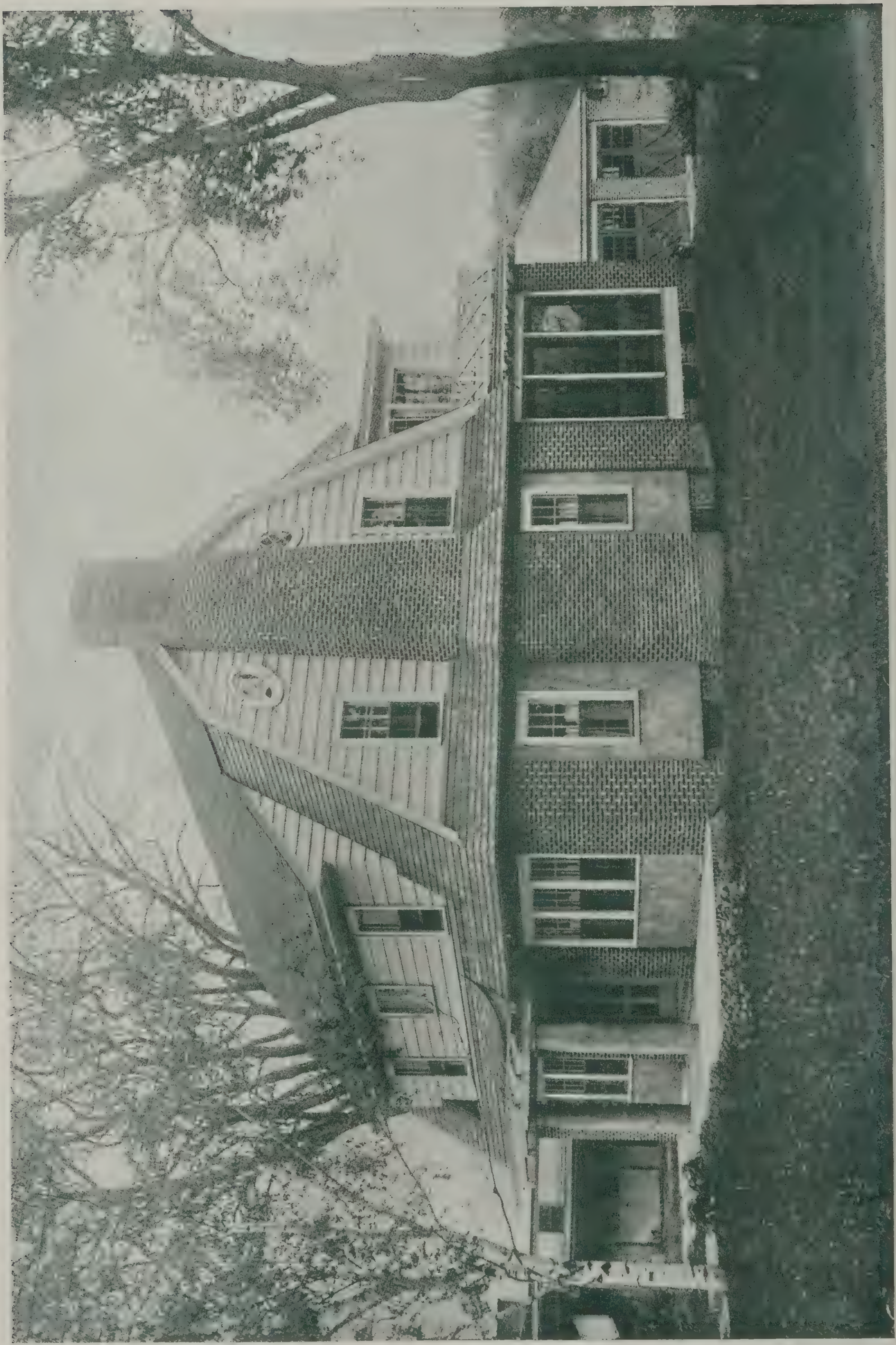


•FIRST FLOOR PLAN•



•SECOND FLOOR PLAN•

HOUSE of James Warburton, Jr., Paterson, N. J. Charles H. Benjamin, architect. The spacious rooms are arranged to secure maximum convenience. The layout is symmetrical and logically planned.



HOUSE OF DONALD WHALING, KEENE, N. H.
Harold E. Mason, Architect

Review of Building Market

Structural Steel Follows Earlier Drop of Other Materials. Small Construction Work and Home Building Under Way. Larger Work Held Up for Possible Reductions in Freight Rates, Labor and Taxes, But This Process Is Expected to Be Slow

PRICE readjustments are still common in the building material market and the most interesting development the past month was the reduction of $7 a ton in steel, which was announced April 12 by the United States Steel Corporation. Structural steel is now being sold about on the same price basis by all mills, including the so-called "independents," and as a result of the drop in price, many large construction projects, which were held up for months, are now going ahead. The drop in steel, however, had no effect upon small house construction, for only in rare cases is steel used in this class of work. While steel is one of the basic building materials, it was not the main factor which caused a reduction in building material prices. It was more or less "dragged down" by other materials, which had decreased in price weeks before the break in steel.

COST BUILDING MATERIAL DELIVERED
TO JOB, NEW YORK CITY,
APRIL 15, 1921

2 x 4 Spruce, M ft.	$60.00
2 x 6 Spruce, M ft.	
3 x 4 Spruce, M ft.	
3 x 6 Spruce, M ft.	
3 x 8 Spruce, M ft.	
2 x 8 Spruce, M ft.	62.50
6 x 8 Spruce, M ft.	
2 x 10 Spruce, M ft.	70.00
2 x 12 Spruce, M ft.	72.50
N. C. pine flooring	70.00
N. C. pine flooring, rift	125.00
Shelving	120.00
Common brick M	21.00
Portland cement, bbl.	3.50
Finishing lime	4.90
Cut nails, keg	5.75
Cut nails, floor	5.75
Building paper, roll	1.00

In the lumber division, for instance, cypress, which was held up entirely too high in comparison with competitive woods, has receded from $10 to $20 a thousand feet during the past month, and eastern spruce has also softened about $10, but these woods were too high when compared with yellow pine, North Carolina pine and Douglas fir, their chief competitiors. Some items of yellow pine, notably flooring and common boards, on the other hand, have stiffened in value, and the yellow pine market, as a whole, is on a firmer basis today than it has been at any time this year. The same may be said of North Carolina pine. Douglas fir is growing in strength, but on account of conditions at the mills on the Pacific coast fir is selling on a wide range of prices. When shipments are secured by water the prices paid are considerably under what is recognized as the "market level," but these instances are rare and apply only to large dealers who are equipped to handle lumber in cargo lots. Much lumber today is moving to consuming markets by water and more will be diverted from rail routes as coastwise water rates are reduced. Water shipments, however, are necessarily confined to seaboard points, but these include the New York Metropolitan district—the largest lumber-consuming territory in the world—and New England, which also consumes great volumes.

There has been a slight softening in other departments of the building material market, notably in Portland cement, which was reduced 60 cents a barrel by the manufacturers two weeks ago. This reduction was caused by the decrease in the price of bags at 15 cents each. Plate and window glass are weaker. Wire glass dropped about 2 per cent. during April. Glass manufacturers, however, state emphatically that the bottom of the market has been reached and they confidently believe prices will be advanced before the end of the summer. Indications now are that present prices will prevail for several months. Common brick is wholesaling about $1 cheaper than a month ago, but the producers of this product also maintain that the price will go no lower. There has been little or no change in common hydrated lime and finishing lime, finishing plaster or dry mortar during the past month, and it appears now that the market on these products will remain steady for some time to come. Paints and varnishes are slightly stronger than they were during the early part of April, and linseed oil and turpentine are showing a better tone, but there is little change in prices actually paid. Hollow tile has receded slightly in value, but there has been no serious break in the market, and none is looked for.

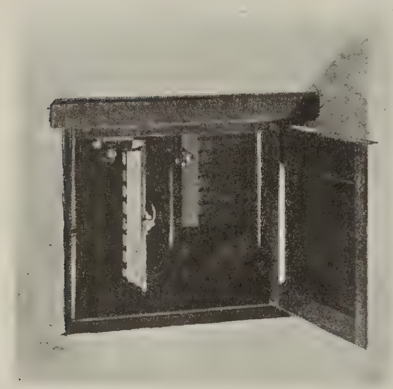
But in the building material industry business has "turned the corner." The improvement has started. It is proceeding slowly, but it has started. Small construction is under way in every of the country, except possibly in a few New England cities, where building trade strikes have temporarily checked everything, and now that steel prices have come down large construction will be resumed. Some has already been started.

Everyone knows that the price of building materials today is not the cause of inactive building, and here "inactive" is used because building activity is not up to normal for this period of the year. The essential factors in the trade today are a downward revision of freight rates, lower wages in the building trades and a reduction in taxes. These must be adjusted before building will proceed full steam ahead. The railroads and the Government are now working on a plan for reducing freight rates; Congress is trying to reduce taxes through the "tariff on imports" route, and in hundreds of cities and towns throughout the country efforts are being made to reduce building labor costs.

New Devices of Interest to Builders

A New Refrigerator Door

AN outside refrigerator door can often be built into the kitchen for the use of the iceman. This door leads into another door in the back of a refrigerator which sets in the pantry, next to the kitchen and saves considerable inconvenience and extra time and labor in handling ice. All of this work is thus saved by the foresight of the builder and home owner and at a very small extra cost for alterations. This idea can be used in any house with good results. The food cannot be reached from the outside, and the ice man has simply to open the door and put the ice where it belongs, closing the door after him.


View from Outside of House

Automatic Drill and Grinder Stop

THE Wodack portable drill is a motor driven drill using either alternating or direct current and automatically stops when not in use. This is due to the fact that the current contact functions through a spring lever in the handle which is released as soon as the pressure of the operator's grip is removed, much on the same order as the valve on a pneumatic hammer or on the same principle as the "dead man" grip controller used by some elevated railway systems.

In addition to the drill, the Wodack Electric Tool Corporation are manufacturing a portable grinder equipped with the same novel style of control. These grinders are made in three sizes, depending on the wheel capacity.

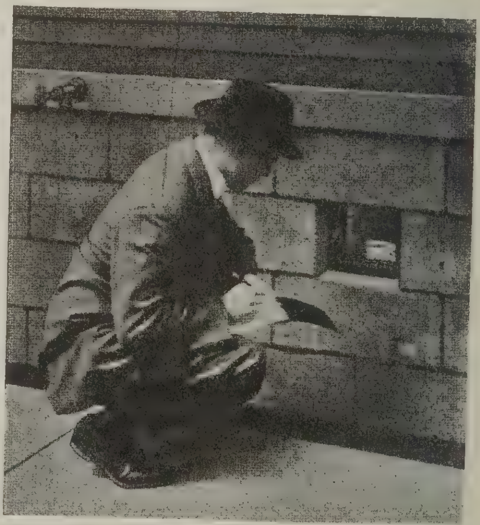
Both tools are fitted with Wodack Universal Motors. The casings are made of high grade aluminum and SKF ball bearings are used throughout. This motor is built to stand severe service.

Improved Method of Installing Meters

A DEVICE being used in many of the houses now under construction provides for installing electric meters in a very advantageous way. By this arangement, meters are set in the exterior wall of the house, facing outward; when the meter is to be read by the public service company's employe, he has no occasion to come inside the house or make his presence known in any way, but reads the meter from the outside.

The time and trouble-saving features of this method are at once apparent, and are not lessened by disadvantages of any sort. The cost is not excessive if the boxes are built in when the house is erected.

Such meter boxes eliminate many objectionable conditions; save basement-space which the meters would ordinarily occupy and protect the meters against accident that might have troublesome results. The manufacturers, Donley Brothers, Cleveland, say that these advantages impress householders so strongly that installations are often made in houses already built—the owners being willing to incur extra trouble and some labor-expense in order to do away with the nuisance which accompanies meters placed in the basement.


Reading a Meter from Outside the House

Legal Department

Answers to Inquiries

ARCHITECT'S RIGHT TO PAY FOR SKETCHES

Our firm contemplates legal proceedings to collect payment for sketches made for a hospital building. Those sketches were made about the time this country entered into war with Germany and owing to the then business conditions and uncertainties the matter was dropped until last Spring when the project was again revived. We at once asserted our claim to be either paid for our sketches or employed to complete the working plans, but were met by the refusal of the Hospital Board either to pay at the usual, that is, American Institute of Architects rate for sketches or to employ us to complete the plans. They did make us an offer of settlement at a figure which we cannot consider.

To make our position absolutely clear to you we would say that a member of our firm made a trip of inspection in company with the president, secretary, and one or two other members of the Board, following which we prepared rough sketches and one-eighth scale mounted drawings of plans and elevations and made estimates of cost of the proposed building. These sketches were made with the knowledge and consent of the Board and we consulted with the building committee while making them and they were finally explained at a meeting of the Hospital Association. No objection was made to our work at any time. When it appeared evident that the work would be indefinitely postponed, we requested the Hospital Board to approve the sketches, which they did and notified us in writing to that effect, and on this understanding we agreed not to press our claim for compensation until the building project should again be revived.

During the time that has elapsed since the sketches were made and the revival of the project the president of the Board has resigned, the old secretary has died and new officers have taken their places. We have consulted an attorney to look into the matter but it seems quite difficult to find court decisions in point and it occurred to us that in view of the fact that your magazine has from time to time been giving court decisions relative to architects' fees, etc., that there might be in your office a collection of citations to cases in point. We are anxious to establish in court that we are entitled to the fees fixed by the American Institute of Architects for such work as we have done in this matter and anything you can do for us along the line requested will be greatly appreciated. I would say that I have been a subscriber to your valuable journal and have taken it for some twenty years.—*E. F. S., Madison, Wisconsin.*

Answer.—Your firm's right to compensation in this case rests solely on fundamental principles of contract law. And in applying these principles, the test of your right to recover is the mutual understanding between your firm and the hospital association. Incidentally questions may arise as to whether the hospital board and building committee acted within the scope of authority conferred upon them by the association.

Below we quote an authoritative statement of the law governing cases of this kind as it has been settled by numerous decisions of the highest courts of the several states. The cases cited in the article quoted from will furnish your attorney a dependable guide as to the law governing your case.

The first important question that suggests itself to our mind is whether you were unconditionally employed to do the work that your firm did. The next question arising is what understanding there was, if any, as to the basis of your compensation; and the third important point is whether the association expressly or impliedly authorized your firm's employment or ratified the action of the board or building committee in retaining you. A further important phase of the controversy may turn on the exact nature of the understanding you had concerning not pressing your claim until the building project should again be revived.

But the facts stated in your letter strongly tend to show that you have an enforceable claim against the hospital association for the reasonable value of your services based on the charges fixed by the American Institute of Architects.

The more important rules of law governing an architect's right to compensation are summed up in 5 Corpus Juris 260-262, 264-265, as follows:

"Where a person employed as an architect to furnish a plan, performs such service, he is entitled to remuneration therefor, if the plan is made in accordance with the directions of the owner. But the right of the architect to compensation depends on the existence of a contract between him and the owner for the services in preparing the plans, and he cannot recover for services voluntarily rendered unless they are accepted; nor can he recover for specifications prepared in violation of the law, unless directed by the owner to prepare them; nor can he recover if, through his negligence, the plans furnished are grossly defective, or of no value to the owner. An architect's right to compensation is not affected by the fact that he subsequently becomes the contractor; but, in the absence of an agreement to that effect, a builder is not entitled to charge for a plan which he prepares and attaches to the specifications as explantory thereof.

"In cases of agency in the employment of an architect the principal may be bound for the architect's compensation, although the agent had no authority to accept the plans, but only cause them to be prepared.

"A contract to prepare plans and specifications and superintend the erection of the structure for a fixed price is an entire one, and recovery cannot be had for a performance of part of the contract without a performance of the other part, or a sufficient excuse for the non-performance. Where, however, the different items are provided for separately, with specified prices for each, the contract is severable and recovery may be had for performance of one item, although it cannot be had for the others.

"If an architect prepares plans and specifications for a building pursuant to an unconditional order or direction of the owner, but without any express agreement as to compensation, he is entitled to recover the reasonable value of the services rendered, whether the plans are used or not, as where the owner abandons his intention to build, or stops work on the plans before they are completed.

"Where the contract so provides, the architect's right to compensation may be dependent upon the plans and specifications submitted by him being satisfactory to the employer or approved by him, or upon the acquisition by the employer of the property designed to be improved, or upon the ultimate determination of the employer to build in accordance with the plans submitted; or it may be dependent upon some other condition or contingency.

"Sometimes architects are invited to submit plans for a building, subject to the condition that any and all plans submitted may be rejected, and where the plans are to be submitted subject to approval, and several have been submitted and rejected, the employer is justified in procuring plans elsewhere, and need wait no longer on the first architect.

"The allowance of a fixed percentage or commission on the cost of the building or work is the usual, fair, and reasonable method of remuneration, especially where the contract so provides. Where the architect's commission for preparing plans and specifications is to be based upon the total cost of the structure he is entitled to the specified percentage on the actual cost of the structure, although, by reason of changes ordered by the owner, the actual cost exceeds the amount originally specified, and the owner cannot reduce the amount of such fees by terminating the architect's employment before the structure is completed; and, furthermore, the architect is entitled to his commission, in case of a change of plans, only on the actual cost, although it less than the cost originally contemplated. If the percentage is to be on the "estimated cost," it will be held to mean the reasonable cost of a building erected according to the plans and specifications, and a usage among the architects will not entitle him to be paid a percentage based on his own estimates.

"Where the contract is silent on the subject the architect will be entitled to a reasonable compensation, and in such a case the customary charges of architects for similar services, as well as other facts and circumstances of the case, may be considered in determining what is a reasonable charge."

Decisions

TO WHAT DEDUCTION IS OWNER ENTITLED FOR DEFECTIVE WORK?

In many cases where a building contractor has failed to strictly perform his contract, by constructing parts of the work in defective condition, an allowance to the owner will be found to be the same whether based on the cost of replacing the defective parts or on a difference in the value of the building, as actually constructed and as it should have been built.

But, as decided by the Indiana Appellate Court in the recent case of Jones et al. vs. Springer et al., 123 Northeastern Reporter, 816, the computation ordinarily should be made on the basis of the cost of making the defective work good. In this case, which was brought to recover damages for defective performance of a building contract, the court said:

"The case was tried on the theory that the measure of damages is the reasonable cost of altering the defective parts of the house so as to make them conform to the plans and specifications. Defendants (the contractor and his surety) contend that the correct measure of damages is the difference between the value of the house as it is and what its value would be if constructed according to the plans and specifications. It is averred in the complaint that the house was defective in that the roof leaked, the cement floor of the basement was of such poor quality that it had no strength and was easily broken, the steps were crooked, the mantel was not level, etc. Under the facts of the case, the court did not err as to the measure of damages."

WHEN IS WORK "SATISFACTORY TO THE OWNER?"

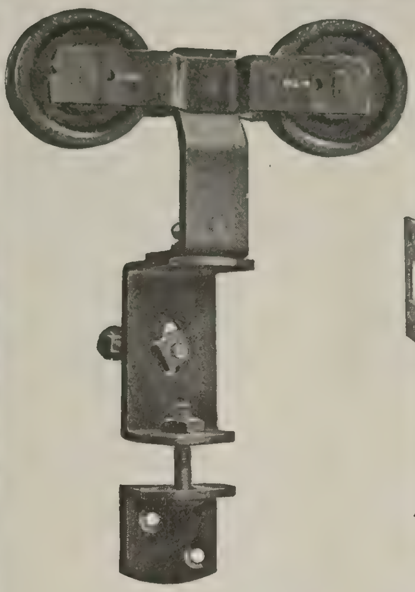
In a recent case (Bruner vs. Hegyi, 183 Pacific Reporter, 369), the California District Court of Appeal applies the well-settled rule of law that a construction contract requiring performance to the "satisfaction" of the owner presupposes that the owner is going to be satisfied with a reasonably careful and skillful performance of the contractor's agreements.

Plaintiff contracted to set tile work in place in defendant's house, on condition that the "work must be satisfactory to the owner." Plaintiff installed the best quality of tile in a good, workmanlike manner. Afterwards, but through no defect in workmanship or material, but probably because of expansion or contraction of the building, became checked or "crazed." Defendant thereupon became "dissatified" and refused to pay the full contract price. Affirming judgment in favor of plaintiff, the court says:

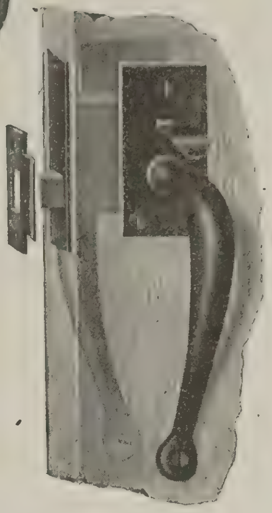
"There are cases that hold that, where the contract requires the work to be done to the satisfaction of the person contracting for it, and the work is of a kind that involves fancy, taste, sensibility, or judgment, and no benefit passes under the contract unless the work be accepted, as where, for illustration, a portrait is to be painted, the promisee's refusal to pay for the work cannot be called in question, provided only that his refusal is in good faith and not from mere caprice. In cases of that character, the question is not whether the one complaining of the work ought to be satisfied, but solely as to the good faith of the dissatisfaction alleged. Where, however, as in this case, the work contracted for goes into a building, the fruits of the labor of the contractor being retained by the owner, the rule is that a stipulation in the contract to perform to the satisfaction of the owner calls for only such performance as is satisfactory to a reasonable person. It is sufficient if the contractor completes his work in accordance with the contract, in such manner that the owner, as a reasonable man, ought to be satisfied with it."

MODERN
GARAGE
OWNERS

SPELL



The Hanger operates on a swivel and turns on the track without sticking or binding in any way.



The No. 27 Latch has no complicated parts to get out of order.

PERFORMANCE SERVICE DEPENDABILITY

N-A-T-I-O-N-A-L D-O-O-R H-A-N-G-E-R-S

FOUR REASONS WHY

1— These hangers enable doors to slide and swing with ease, thus saving strength and energy.

2— The adjustable features of National Door Hangers are designed to overcome the rising and swelling of floors and make doors weather tight, thus eliminating worry about weather effects.

3— By means of a flexible hinge joint the door is protected from vibration. This lengthens the life of the door and assures greater service.

4— Simplicity in design makes National Door Hangers fool-proof and easy to operate.

Try some on your next job. You will soon find that nothing else will do.

Write for booklet,
"National Garage Hardware"
and mention dealer's name.

NATIONAL MFG. COMPANY
STERLING, ILL.

New Catalogs and Publications

497. Richards-Wilcox Mfg. Co., Aurora, Ill., have their April booklet on Doorways ready. It contains short articles on vanishing French Doors, Multifold Windows for Springtime, Warehouse Doors and Efficiency and the usual departmental items.

498. Curtis Service Bureau, Clinton, Iowa. An unusually interesting series of booklets has been prepared by this company covering a wide range of topics of value to builders and carpenters—and home owners. They relate more specifically to woodworking and places throughout the house where wood is effectively employed. Stairs, windows, door frames, entrances, built-in furniture and other topics are described and illustrated.

499. Okonite Insulated Wire and Cable. The Okonite Company, Passaic, N. J. Handbook illustrating and describing the Okonite insulation manufactured by this company. Some excellent technical information dealing with the subject of insulation is contained.

500. Old European Slate Roofs. Knickerbocker Slate Corporation, New York City. Attractive booklet describing the advantages and beauty of slate roofs. The various color schemes that can be obtained are given. Photographs of buildings on which slate roofs can be found are shown.

501. Wissler Patented Level. A Transit and Level Combined in One Instrument. Wissler Instrument Co., St. Louis, Mo. Descriptive folder featuring especially the Wissler Patented Builder's Level, also the complete line of transits, levels, etc., made by this concern for architects, contractors, surveyors and engineers. Special emphasis is placed on buying guaranteed instruments direct from the Wissler factory at attractive prices.

502. Murphy Door Beds. Murphy Door Bed Company, Chicago, Ill. Interesting folder showing the use of Murphy In-a-Dor Beds by actual photographs of installation. Detailed plans showing how this bed saves space and also showing its detailed operation accompany this folder.

503. The Roof Everlasting. Mohawk Asbestos Slate Company, Inc., Utica, N. Y. Illustrated booklet describing a product being marketed by this company, called "Mohawk Tapered Asbestos Slate." This is an asbestos shingle or slate tapered like a wood shingle and is made in various colors to give any desired roof effect.

504. Wood Finishing. S. C. Johnson & Son, Dept. B. A. 4, Racine, Wis., publish a valuable book on this topic illustrated in colors. It is written for the practical man—contractor, builder, architect, decorator, painter, by wood finishing authorities.

505. Floor Surfacing. The American Floor Surfacing Machine Co., 521 South St. Clair St., Toledo, Ohio, circulates a catalogue on saving time and money by the use of the American Universal.

506. American Magnesite Corporation, Springfield, Ill., issues a folder on Stucco and Flooring, giving uses and advantages of this material for home builders.

507. Lexington Furnaces are fully described and illustrated in a booklet published by Cutler & Proctor Stove Co., Peoria, Ill., showing features of construction and installation.

508. Sturtevant Stationary Vacuum Cleaners. B. F. Sturtevant Company, Boston, Mass. Catalog No. 248 very thoroughly describes and illustrates these vacuum cleaners. This catalog contains interesting technical data showing dimensions of various types of cleaners together with pipe charts and proper specifications from which can be determined the proper size of plant for any service.

509. Economy in Building. MacAdams & Call, Chicago, Ill. Illustrated booklet describing E-Cod Fabric, which consists of a heavy felt paper saturated in tar and reinforced with galvanized wire for service as a plastering base. Specifications for both interior and exterior plastering and curtain walls are given.

510. Von Duprin Self-Releasing Fire Exit Latches. Vonnegut Hardware Company, Indianapolis, Ind. 48-page attractive booklet thoroughly illustrating and describing these self-releasing fire exit latches, which are applicable to all types of doors wherever people congregate and quick exit may be necessary. This booklet also describes the Von Duprin automatic locking operator and adjustor for casement windows.

511. Blue Print Machinery and Drafting Room Supplies. C. F. Pease Company, Chicago, Ill. Catalog B covers in a complete manner drafting room equipment and supplies of all kinds. This illustrated catalog is also accompanied by descriptive bulletins No. 4100, 4102, 4103 and 4104. These include everything from blueprint machinery, drawing tables, drawing instruments, ink, plan filing cabinets to surveying instruments. Of particular interest is the Pease vertical plan-safe in which drawings can be filed vertically.

512. TUEC Stationary Cleaners. United Electric Company, Canton, Ohio. Illustrated bulletin No. S-15 gives standard specifications together with capacity and limitations, size of piping, typical piping layouts, etc., for the vacuum cleaner for stationary service manufactured by this company. Particular attention is called to the engineering service of the company, which, it is stated, is available at all times for architects.

513. California Redwood Association, San Francisco, describes in a 25-page booklet various special uses for California Redwood. There are suggestive illustrations.

514. Complete lines of fireplace fixtures and other metal conveniences for the house are illustrated in a booklet published by the Colonial Fireplace Co., 4603 West 12th Street, Chicago.

515. The O'Brien Woven Lath. O'Brien Woven Lath Company, Chicago, Ill. Illustrated 12-page pamphlet describing in an interesting manner how woven wood as a base for plaster and stucco has been developed by this company, and pointing out its advantages and economies.

516. Windustite. American Metal Weather Strip Company, Grand Rapids, Mich. 8-page folder in the form of blue prints, showing the application of this company's weatherstrips to various and sundry types of windows, including pulley windows, casement windows and French doors, metal windows, austral windows, door thresholds, etc. These details show both the method of application and operation.

McKINNEY
COMPLETE
GARAGE SETS

For all types of
Entrances
including Swinging
Sliding-Folding
and
Around the Corner

Designing the Garage

TODAY, garages must harmonize in design and beauty with the home. In planning a garage the doors are of great importance—especially where space is limited.

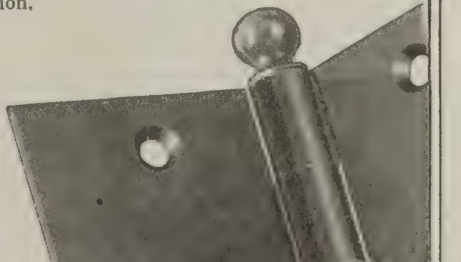
Architects and Builders find the story of McKinney Complete Garage Sets of timely interest. These sets contain all the hardware necessary to make possible swinging, sliding-folding or "around-the-corner" types of doors—for all size entrances. They permit a wide range of design and promote artistic arrangement. At the same time they help reduce building expense.

These garage sets are developments of the McKinney Manufacturing Company—prominent for more than half a century in the building of quality hardware.

We would like every Architect and Builder to have a copy of the book on McKinney Complete Garage Sets. It pictures and explains the sets and also gives the plans for their installation. This book adequately suggests the wide variety of doors these sets make possible and shows how their use is valuable where space enters as a factor. A request puts this book on your desk.

McKINNEY MANUFACTURING CO., Pittsburgh
Western Office, Wrigley Bldg., Chicago. Export Representation.

McKINNEY
Hinges and Butts



Also manufacturers of McKinney garage and farm building door hardware, furniture hardware and McKinney One-Man Trucks

517. Kent Stationary Kleaner. The Kent Vacuum Cleaner Company, Inc., Rome, N. Y. Illustrated booklet describing the Kent Stationary Kleaner, which is a small compact machine for location in the basement. It is operated by electric motor controlled by push-button switches near the various outlets for cleaner hose attachments.

518. The Dutch Boy Painter for March, published by the National Lead Co., New York, contains short articles on conditions affecting the life of paint, on color in hospitals and hotels, and other short and useful items.

519. A very instructive pamphlet is printed by the Steam Corporation, 215 North Michigan Ave., Chicago, with regard to Nokol Automatic Oil Heating. The use of oil as fuel is gaining in popularity by rapid strides, and this booklet tells why in a way that will carry conviction. Building Age readers should know about this.

520. Mohawk Asbestos Slate Co., Inc., Utica, New York.—A descriptive folder which tells about Mohawk Tapered Asbestos Shingles for roofs of character and durability has been issued and will be sent on request.

521. Wiremold Catalogue. Wiremold tubings and fittings are fully described in a small booklet issued by the American Wiremold Co. of Hartford, Conn. These indicate neatness and ease of installation, and it is stated that fewer fittings are required by their use than otherwise.

522. Radiantfire. General Gas Light Co., with offices in New York, Kalamazoo and San Francisco, manufacture a heating equipment which they claim makes the fireplace useful as well as ornamental. A special catalogue for builders shows various types and sizes and specifications for installing the simple ventilating flue.

523. McKinney Hinges and Butts. McKinney Mfg. Co., Pittsburgh, issues an illustrated book on garage doors, showing installation and details of hinges and butts, which they claim point a way toward simplified construction and lower building costs.

524. Lunken Windows. The Lunken Window Co., 4052 Cherry St., Cincinnati, Ohio, maintains an architectural and engineering department for the service of architects and builders. Detailed information will be sent on request.

525. Kodak on the Job. Eastman Kodak, Rochester, N. Y., publish a catalogue that tells about keeping records of building operations by photographs. It would serve a good purpose to investigate this publication.

526. The Story of Kellastone. The National Kellastone Co., Room 517, 155 E. Superior St., Chicago, will send a booklet of this name on request. It tells how old, out-of-date buildings may be effectively transformed into structures of modern architectural dignity by overcoating them with Kellastone.

527. Vulcanite Roofing. Samples and literature describing Vulcanite Roofing Shingles may be received from the Beaver Board Companies, Main Offices, Buffalo, N. Y. These show how to save time and money and get accuracy of result.

528. Kawneer Store Fronts. It is the store front that gives prospective customers their first impression and it is therefore important that the store front should receive the careful consideration to which it is entitled. Write the Kawneer Co., 1125 Front St., Niles, Mich., for details.

529. Republic Mixers. A new catalogue has been printed by the Republic Iron Works, 427 Evans St., Tecumseh, Mich., describing methods of mixing that bring the right result.

530. Coulson Store Front Construction. Catalogue and blueprints may be had from J. W. Coulson & Co., 95 West Spring St., Dept. B., Columbus, Ohio, explaining how to protect store fronts against breakage from warping, shrinkage, expansion and rot.

531. Starrett Tools. Builders should ask for Catalogue 22 "P" which describes tools that are useful on every job. L. S. Starrett Co., Athol, Mass., are the manufacturers.

532. "Remember It's Waterproof." This is the slogan of Toch Bros., 320 Fifth Ave., New York, with reference to liquid Konkerit, a cement paint which is stated to stop dampness from penetrating the surface of buildings and to impart a uniform and attractive finish to stucco, concrete, etc.

533. J. D. Wallace Portable Electric Equipment affords opportunity to lower costs, according to data printed by the Wallace Co., 1419 W. Jackson Blvd., Chicago.

534. L. & I. J. White Co., Buffalo, N. Y., may be addressed for a description of axes, adzs and other tools which they have been studying for 84 years.

535. National Asbestos and Asphalt Roofing is described in Booklet C of the National Asbestos Mfg. Co., Jersey City, N. J. This is claimed to be "indestructible and imperishable."

536. Carpenters' Catalogue. Mack & Co., Brown's Race and Platt St., Rochester, N. Y., publish "The Carpenters' Catalogue" and "True Stories" for those interested in tools that give real service.

537. Huther Bros. Saw Mfg. Co., Rochester, N. Y. A catalogue may be obtained from these people discussing solid tooth circular saws, mitre saws, dado heads, solid plate groover saws, matcher cutters, lock corner cutters, specially ground circular saws and a large assortment of others for every kind of woodworking.

538. Ransome Machinery Co., Dunellen, N. J. Catalogue illustrates and describes two types of mixers—a cement mixer and a builder's mixer.

539. Federal Motor Trucks. Builders who are alive to the reliability and usefulness of a good motor truck will be interested in a description of the Federal Motor Truck Co., 39 Federal Ave., Detroit, Mich.

540. U. S. Mineral Wool Co., 280 Madison Ave., New York, may be addressed with reference to mineral wool for building. This material, used in house lining, is fireproof, vermin proof and reduces the fuel consumption. It also deadens noises and has many other uses on which builders should be informed.

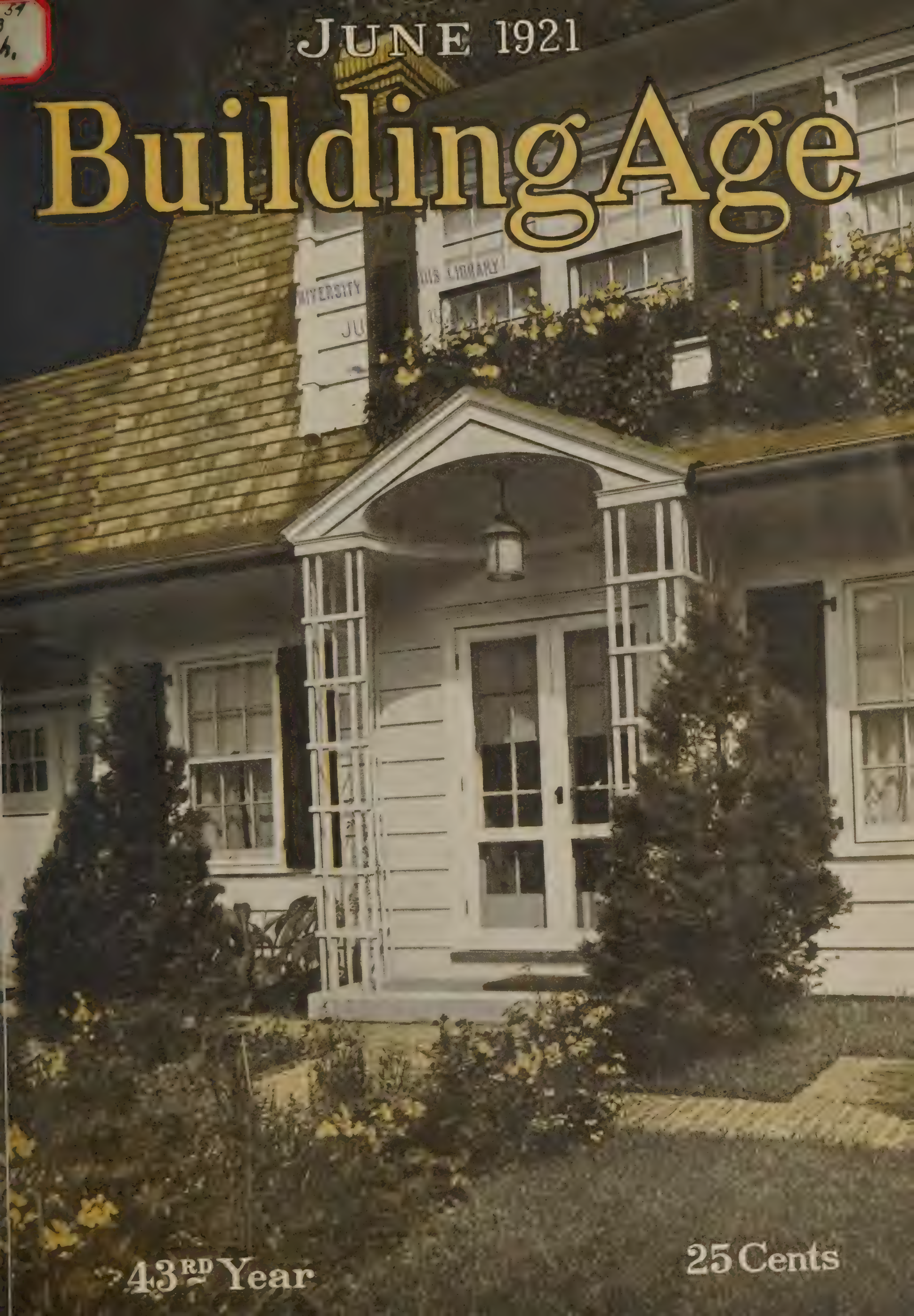
541. Dutch Boy White Lead. National Lead Company describes in interesting booklet the amplifications of their slogan "Save the surface and you save all."

542. Ideal Sheathing Paper. Bermico, made by Brown Co., of Portland, Maine, is described in the literature issued by that firm. Details will be sent on request.

543. Helm Brick Machine Co., Cadillac, Mich. Descriptive literature may be had from this firm by mentioning Building Age, that tells about brick-making and brick-making machinery.

JUNE 1921

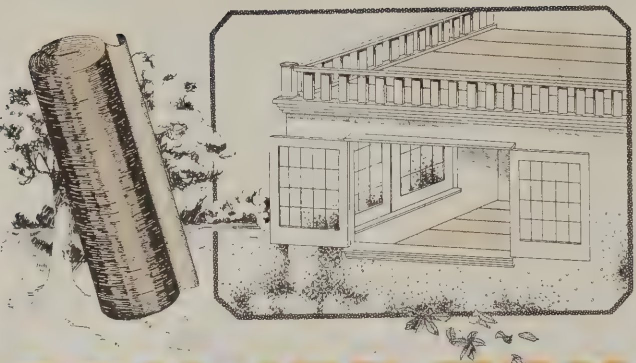
Building Age



UNIVERSITY LIBRARY

43RD Year

25 Cents



CON-SER-TEX

CANVAS ROOFING

For Flat Roofs and Porch Floors

—an attractive, water-proof, rot-proof, mildew-proof covering that will not crack, stretch, shrink, curl or peel. The chemical treatment applied during manufacture makes it the most advantageous material for use in covering floors, flat roofs, sun parlors, sleeping balconies, and the like. Cool in summer, and easy to keep clean. All these features explain why it has become such a favorite with owners.

Carpenters and builders should push "Con-ser-tex" Canvas Roofing, because it enables them to secure many contracts for work on which more expensive material would be out of consideration. If you show your clients how to save money on roofing, they will let you show what service you can render them in other directions too. Con-ser-tex is easy to lay, and brings a good margin of profit.

Write for illustrated booklet, "Roofing Facts and Figures," and for samples.

WM. L. BARREL CO.

50 Leonard Street New York City

Chicago Distributors:
Geo. B. Carpenter & Co.
430-440 North Wells St.

California Distributors:
Waterhouse-Wilcox Co.
San Francisco & Los Angeles

FLOORS

The Wood-Mosaic Kind

For every home—Old or New. Can be installed by your mechanics. Our 5/16″ flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood Carpet, strips Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalogue in natural wood colors.

Wood-Mosaic Company
New Albany, Indiana

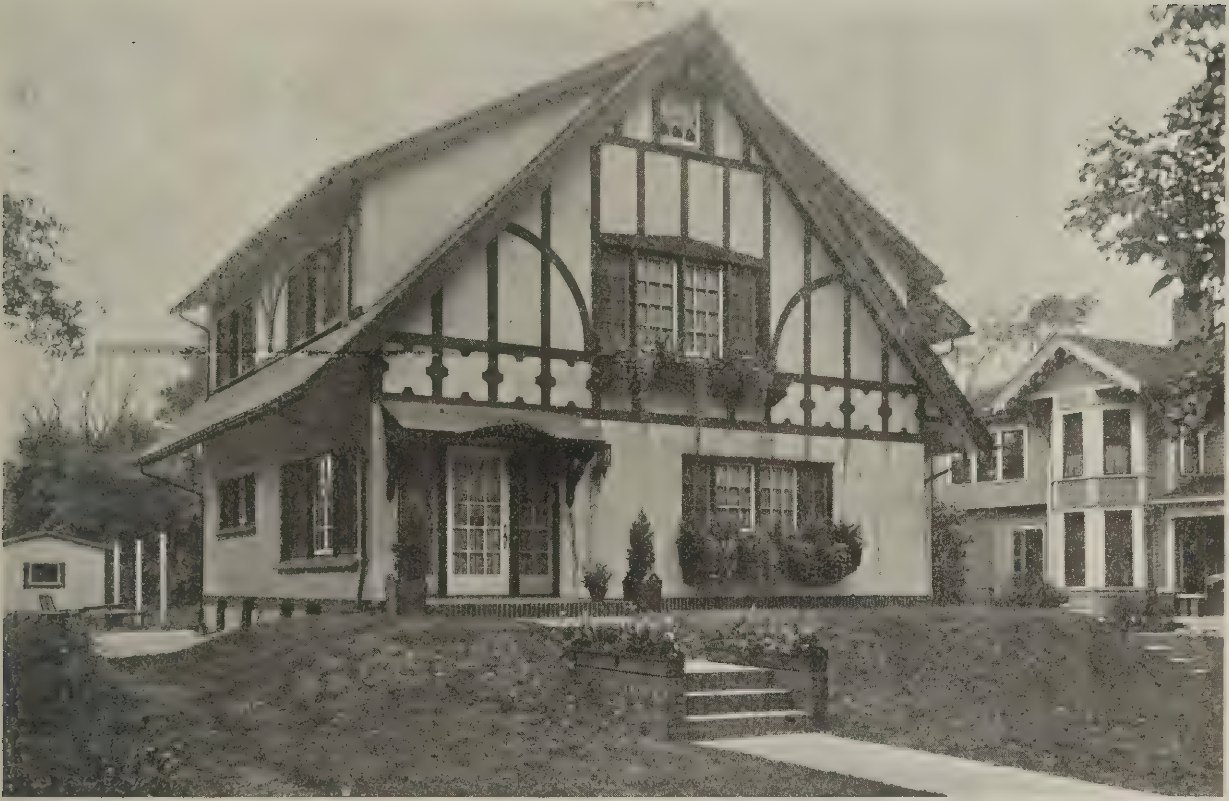
Fiberlic Wall Board

The *material* from which it is made, the fact that the pulp is *chemically cleansed* and that the *fibre lengths* give the finished product that *natural reinforcement* that is lacking in ground wood boards, is in itself a guarantee of the superiority of Fiberlic for *strong, permanent, economical* and *sanitary construction.*

MacAndrews & Forbes Company
200 Fifth Avenue, New York City
Factory: Camden, N. J.

BUILDING AGE

New York, June, 1921



RESIDENCE JOHN S. AHLGREN, TERRE HAUTE, IND.
Johnson, Miller & Miller, Architects

What to Think About When You Plan a House

Illustrating an Indiana Home Where the Design and Planning Have Been Given Careful Thought

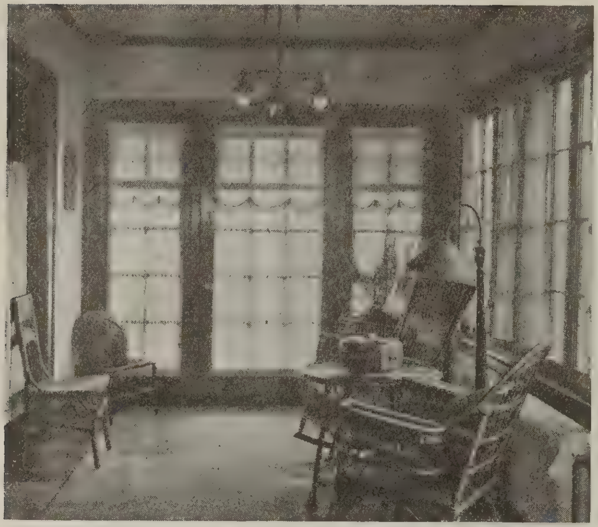
GOOD planning is a real art whether the home be large or small. It implies an exterior design and interior arrangement that will give the greatest convenience and beauty for the money spent.

The house herein illustrated is the residence of John S. Ahlgren, Terre Haute, Ind., and the architects, Johnson, Miller & Miller, have shown a keen appreciation of what a good house should be as indicated by the general layout.

Take the exterior for an exampie. The roof construction is simple but its treatment is artistic and effective. There are no hips, valleys or other expensive construction to run up the cost, and the money thus saved may be put to good use elsewhere without detracting at all from the exterior beauty. The dark wood trim and brick sills are in excellent contrast to the stucco surface, and the flower boxes at the windows and steps give the final artistic touch.

The arrangement of the rooms in this house is a reminder that convenience, balance and economy should go hand in hand.

The reception hall is really a sun porch—another room of the house—with its ceiling light, portable floor light and hot water radiator under the win-



The combined reception hall and sun room is well equipped with light and heat to give comfort the year around. Note the canvas carpet

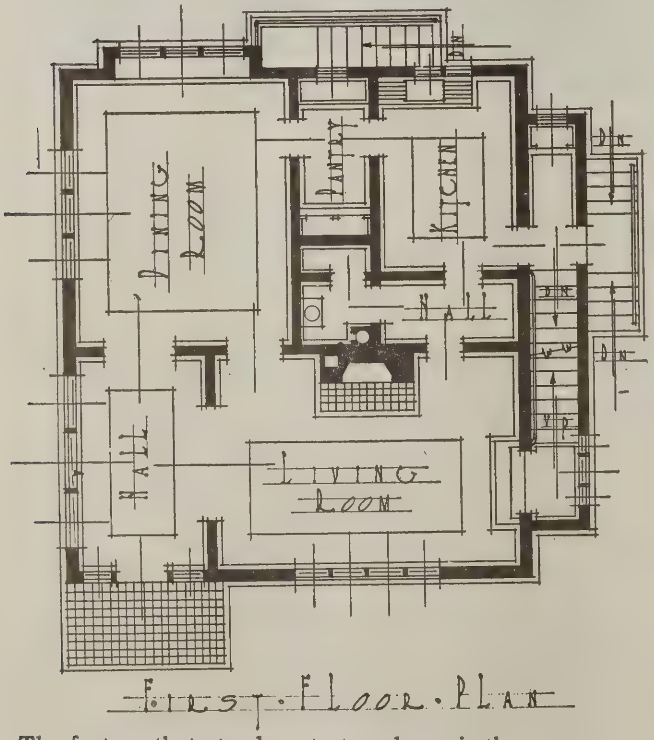
dows. Note the canvas floor covering on the hardwood floors and the high ratio of window to exposed wall surface. From this room, there is an entrance direct into either the dining or living room. The balance and arrangement here are particularly pleasing. The large brick fireplace in the center of the wall opposite the large front windows is correctly located so that its chimney carries two flues and serves the heating plant in the basement as well. This room may be said to face the fireplace. That is, there is sufficient unbroken wall space opposite to allow the furniture to look that way. The comfortable sofa under the window is a fine place for reading and it looks right at the cheerful fire.

To balance the entrance to the sun room on the left, there is the entrance to the open staircase at the right with its window over the landing. The stairway and sun room on either side of the room give the appearance of size to the already large room.

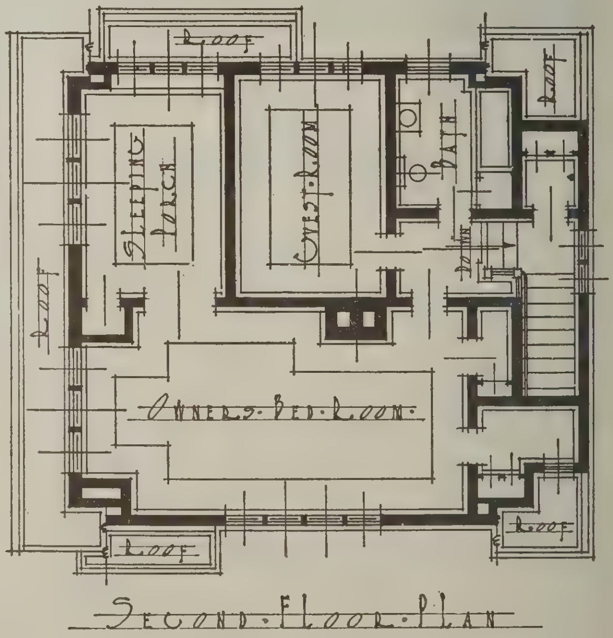
The most useful features of the dining room are the wall space allotted for buffet, serving table, etc., and the large windows in the two outside walls.

In the other corner of the house is the kitchen, with the sink and double drip boards under the window. The refrigerator is outside, away from the heat, and at the head of the cellar steps. Between the kitchen and dining room is the pantry with its window, work-table and cabinets, conveniently arranged to save steps for the housewife.

Hall space is reduced to a minimum, because, as the Scotchman said, "It doesn't get you anywhere." There is a small rear hall betwen the kitchen and living room which has a wash stand and serves as a coat room.



The feature that stands out at a glance is the economy of steps for the housewife



The second floor rooms are large and well arranged. The hall has been reduced to an upstairs landing

Looking from a corner of the living room into the dining room

The layout is strikingly economical and convenient. The housewife's steps to the different rooms during her daily work have been thoroughly considered. The cost of construction has also been given careful thought, as the square plan will indicate. This design presents a minimum external surface to be covered with sheathing, metal lath and stucco. And the roof, as we have said, is simply constructed, while but one chimney crowns the whole structure, serving all the smoke-making equipment in the house.

On the second floor the owner's bedroom holds our attention immediately—large enough not merely for a bed room but a lounging room and den as well. The large window space gives ample light and ventilation, and it is well to note that correct cross ventilation is possible because the windows are placed in adjacent walls. There is sufficient vacant wall space in different parts of the room to permit the bed to be placed out of the direct draft and still insure good fresh air for the occupant.

Or, if he wishes to sleep elsewhere, the door at the left leads into a large sleeping porch, well aired by cross ventilation and separated from the bed room only by large French doors.

The guest's room is naturally less used and the cross ventilation feature may be omitted, especially since there are three large windows.

The bath room has been placed where it should be—right over the kitchen to save in the plumbing fixtures and pipe. Its size indicates that the fixtures have not been cramped together with just aisle room between, but have been laid out to permit entire freedom. Again the hall space has been reduced to a minimum.

Good judgment has been used in the size and distribution of closets with view to utilizing what would otherwise be waste space. The owner's bedroom has a large wardrobe and dressing closet, which occupy a corner in the house where the eaves are closer to the floor—in spaces that might otherwise be wasted.

The sleeping porch is also provided with ample closet space and window seat, while the closet for linen and bedding is just at the head of the stairs and in a place that could not have been used for anything else.

Doors do much to make a house comfortable or otherwise. In the house shown here the architects have secured easy access to every one and still maintained the desired balance by the well-considered distribution of these openings.

The attention given to such points as have been mentioned here is the difference between good building and bad building—the difference between economy and extravagance—the difference between low cost and high cost in the house.

More clients want houses costing under $10,000 than over. There lies the biggest field for building activity today, because there lies the greatest demand. It is up to builders to cut down costs by cutting down extravagant houses.

Build the House Beautiful—Yes! But let the House Beautiful be also the House Economical, by intelligent planning as well as intelligent organization and construction.

Looking into the living room from the sun room. The open fireplace with wall lights on either side is the most attractive feature, but the stairway leading to the second floor ranks a close second

How Shingle Staining Gives Individuality

Some Pointers to Be Observed When Using a Creosote Shingle Stain

Much of artistic effect lies in proper contrast. Selection of proper colors with a view to contrast as well as harmony with surrounding scenery has made this bungalow "different"

THIS modest bungalow reflects its individuality not only in its pergola and trellises but in the shingle treatment as well. A pleasing contrast to the white trim is obtained by staining the roof shingles a moss green.

The wall shingles have been well arranged. Staining these shingles gray or slate color effects a pleasing contrast to the white trim.

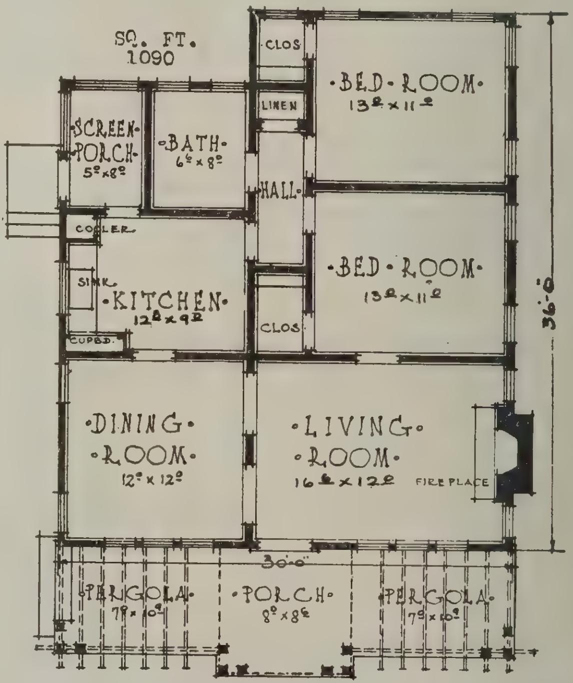
With wood shingles it is the general rule to use but one color on the roof. On the sides of the house a little departure from this rule is sometimes made. For example, mottled color effects are sometimes produced by using two different stains, say, red and green, on the same job. This is done by alternately dipping the same brush first in the red and then in the green. Such a process is not for the amateur painter, however, and should not be attempted except by an experienced man.

For the roof of the house a dark shingle stain is generally preferable to a lighter one. Olive green is quite popular, because it harmonizes well with the green of the surrounding trees and shrubbery.

Ready-stained shingles in red, green, white and gray may be had from the manufacturers, or the staining may be done on the job. If a creosote stain is used, the shingles should be dry when treated so as fully to absorb the stain into the pores of the wood. This insures greater durability of color.

The shingles should be dipped at least two-thirds of their length. They may then be thrown into a pile to dry. After placing on the roof a brush coating will insure that every part of the exposed shingle will have a covering of stain.

In connection with shingle staining, it is well to bear in mind that proper treatment of the shingles will increase their life. A gallon of stain is generally sufficient to cover 100 sq. ft. of roof surface with two coats of stain.



A comfortable, compact floor plan adds convenience to the attractive bungalow shown above

Grounds About the House

The Contour of the Property Often Makes an Attractive Concrete Sunken Garden Possible

By Albert Marple

CONCRETE is now being used successfully and attractively in Southern California for improving the grounds around the house. The rapidly increasing popularity of this material in that section shows that the people of that locality have learned "the trick," if such a thing exists, in the use of concrete. It may almost be said that Southern California is being built of this versatile and enduring material. The uses to which it is being put are many but this story will deal with its use in making attractive garden features around the home.

While concrete has long been used in connection with the improvement of home grounds, this brief article will tell about a garden feature, where it has played an important part and known, because of its very character, as "The Sunken Garden Retreat." It is built directly within the hillside and is the means of improving a corner that would otherwise be anything but beautiful.

The cost of this feature to the builder was only the expense of the cement, the reinforcing iron rods and the labor. The cobblestones and sand were secured from a nearby storm water drain, and the timbers were cut right on the property.

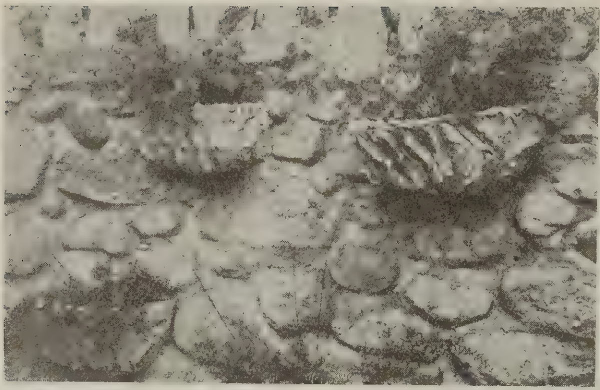
A Sunken Garden Built in the Hillside

The room measures about 16 ft. across. The wall is what might be termed a double-deck affair. The upper or higher wall starts from the pier at the entrance and runs back into the hill, rising gradually with the slope of the hill. From the rear of the room the wall continues around the other side to the other pier. At the entrance this wall is about 5 ft. high, while at the rear, its highest point, the upper edge of the wall is something like 10 ft. above the floor of the room.

Close-Up View of Log Constructed Pergola

Entirely independent of the higher wall is the smaller or front wall. Starting at one side at a point midway between the pier and the rear of the room, and flush with the higher wall, this wall continues toward the rear of the room, at the same time separating gradually from the high wall. This separation continues until the rear of the room is reached, at which point the two walls are about 2 ft. apart. In other words, the front wall extends about two feet into the room. From this point the smaller wall continues around the room gradually approaching the larger wall and meeting it at a point midway between the rear of the room and the pier on the opposite side. The space between these two walls is filled with earth and in this space ferns and flowers of various kinds are growing. The lower wall is 5 ft. high all around. The reinforcements of the larger wall are half-inch steel rods, spaced a foot apart.

A feature which adds materially to the appearance of this room is the numerous flower and fern holders which cling to the face of the walls. There may be



Boxes for Flowers May Be Placed on the Side Walls

any number of these little features, and variety in size and shape will eliminate anything that would resemble an undesirable "sameness." The baskets on the face of the walls are shaped out of lathing wire before beginning work on the room. As the walls are erected the extending wires and braces for these baskets are placed in position between the boulders and concrete. When walls are finished and the concrete fully set, these basket frames are covered with natural-color concrete, the same as that used in the walls and mixed to a consistency of soft putty. The interior of the baskets are finished smooth. A ragged and uneven outside surface adds to their beauty and is in entire harmony with the rugged appearance of the walls.

The room is roofed by a log pergola. To these various logs the bark is still clinging, giving a unique, rustic appearance to the whole structure. The uprights are also logs which range in diameter from 8 to 14 in., while in the roof section logs 4 to 12 in. in diameter are used.

The furniture within the room harmonizes with the logged roof. It is made of oak branches that have not yet been stripped of their natural covering. At night the room is lighted by an incandescent lamp which is attached to the under side of a beam directly above the center of the room. Within the lower wall at the rear of the room an arched opening has been left for a sanitary drinking fountain.

A Novel Method of Wrecking Masonry

To break up an old stone wall or other masonry, or to knock out a superfluous brick pier without the use of dynamite, slow hand labor is unnecessary. Simply drill a good-sized hole in the wall—making this bottle shaped with as small an opening as possible. Put in quick lime until this hole is almost full and make a tight-fitting wooden plug that can be driven firmly into the opening. Quickly pour in enough water to slake the lime and drive home the plug.

The expansion of the lime as it slakes will exert a tremendous pressure that will easily break up any ordinary piece of masonry.

Artistic Fountain Detail in Cast Stone

HERE is a detail of a small fountain in the court of an artist's studio located on the roof of an office building at 16 East 37th St., New York.

The illustration shows how well the architects, Jacob Gescheidt & Co., New York, have succeeded in transplanting a little Garden of Eden from some cool and quiet woodland to the hot and dusty top of an office building in New York.

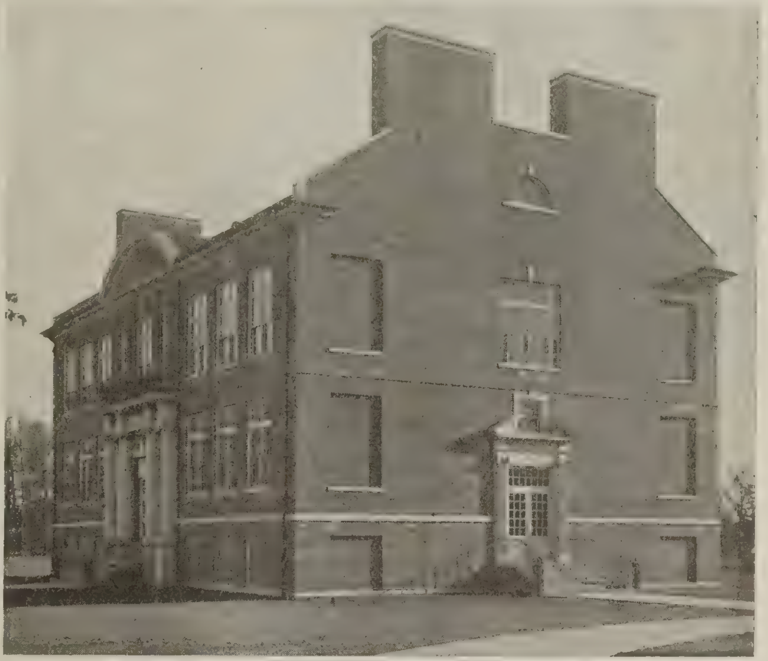
The cast-stone flower boxes, tile floor, wood lattices, the hanging fern basket, luxuriant shrubbery, the little fountain gargoyle, make us think that this might not be unlike some sequestered nook in an old Italian garden.

The effect is pleasing and, even in this picture, we can almost hear the water gurgle as it falls into the mossy-bottomed basin.

Art and nature are skillfully combined on the roof of this office building in New York. Cast stone features have done much to make this possible and economical

A Small School Building

Washington School at South Manchester, Connecticut, a Well Designed Small School Building for 150 Pupils



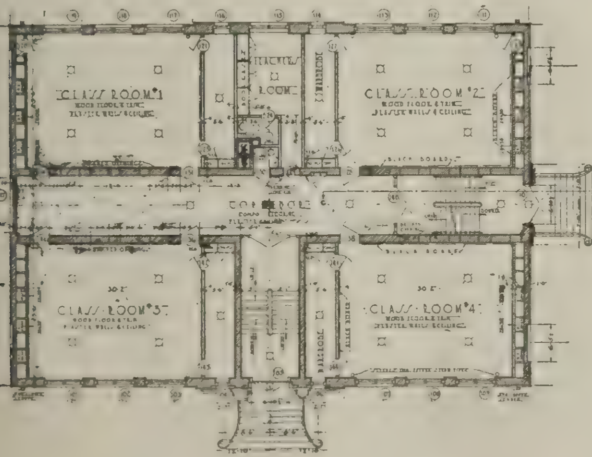
WASHINGTON SCHOOL, SOUTH MANCHESTER, CONN.
Frank C. Farley, Architect
Illustrating an economical design for a school building of this size. Provision at each end has been made for future extension

THE construction of the school shown here is brick with stone trim. In executing this building, the architect, Frank C. Farley, has attained simplicity of design and construction, and the structure is presented here as an economical arrangement for a school of this size.

The basement contains, besides the heating plant and coal room, the toilets and a kindergarten room. It should be noted that the main floor of the building is sufficiently above the ground level to permit of ample windows for lighting all basement rooms. All the flooring is of cement, except in the kindergarten, where it is of wood, and in the toilets, where it is of asphalt. The walls and ceiling in the kindergarten are plaster.

A plan is shown of the first floor, which is also typical of the second floor. There are four class rooms on each floor, having wood floor and trim, with plaster walls and ceiling.

The rooms have windows on one side only. The other exposed side has been left solid, except for a window at each end of the second floor corridor and an entrance into the first floor corridor. This has been done to permit of future extension, as will be explained later. There is a wardrobe in each class room and this has been provided with storage shelves for supplies, etc.

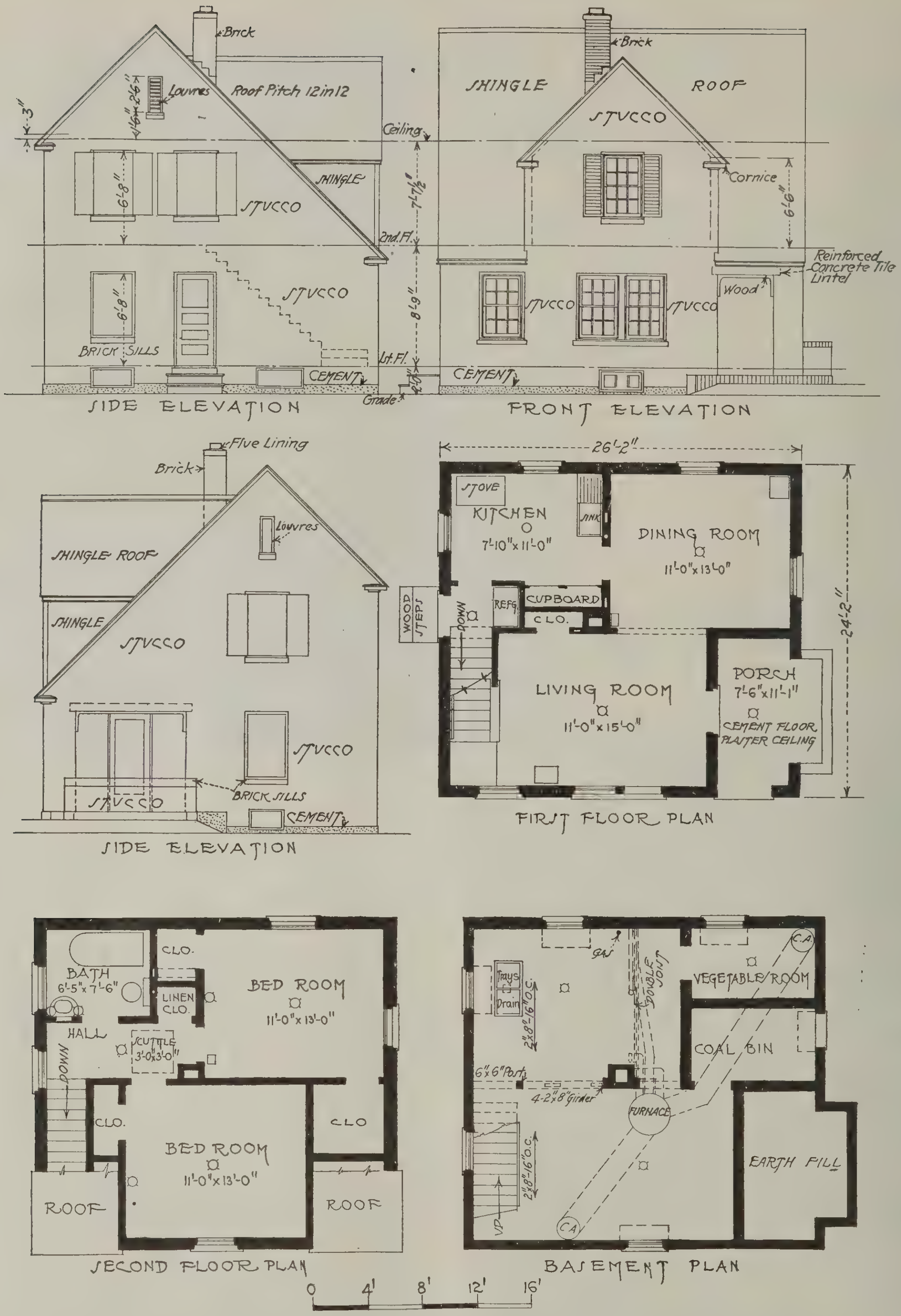


TYPICAL FLOOR PLAN
Four class rooms on each floor and a kindergarten in the basement

As indicated above, the building was planned and constructed to permit of future addition to either or both ends. The window in the middle of the end walls on the second floor and the door on the first floor would then be removed and the corridor extended into the new additions.

To remove the monotony of the present plain brick end wall, it was decided to make use of a false window feature as shown in the photograph.

School buildings like the one here illustrated reflect credit upon the communities where they are located.



ELEVATIONS AND PLANS OF THE HOUSE SHOWN ON PAGE 27

Note the economical square plan, arrangement of rooms and elimination of hall space

Small House Developments

IN the past, housing developments on a large scale have quite often been disappointing. There has been too much uniformity of types, construction and planning. They have been monotonous to look at.

Today things are different. Housing developments are the product of the best thought of trained builders and architects experienced in small house planning. Different sets of plans are used in the same development and different exteriors are used on the same set of plans. Additional variety is obtained by using different types of construction, brick, frame, stucco, etc. The result is that the development of today looks like a little village. The houses look different. They *are* different.

The houses built by the Studebaker Corporation at South Bend, Indiana, for their employees have no objectionable uniformity or monotony, and one could even believe that they were built separately and independently. There are brick, clapboard, shingle and stucco, half-stucco and half-frame types. There are hip and valley types and simple gable, front dormers and side dormers, front entrances and side entrances—and the different types are well distributed.

A picture of a two-story, five-room, stucco and shingle-type is shown here. The trim is white and the shutters dark green.

The entrance at the side is from a cement-floor porch and leads directly into the living room. On the opposite side of the house is the tradesmen's entrance adjacent to the kitchen.

The plan is square, with one chimney. The bath is directly over the kitchen. These features make for economical construction. There are three rooms on the first floor—living room, dining room and kitchen. Two bedrooms with bath are on the second floor. The basement plan shows a laundry, coal room, vegetable room and a large front room for storage and general purposes.

The furnace is well located near the laundry and insures warmth there in winter.

The feature of this small house is the electric wiring. There are three-unit ceiling fixtures with all switches and wall outlets in living and dining room, a single-unit ceiling fixture with wall switch and wall outlet in the kitchen and a single-unit ceiling light and wall switch in the back hall. On the side porch is a single-unit ceiling light.

In every basement room, except the coal room, is a drop ceiling single-unit light and it would have made a more complete job to have provided one or two wall outlets as well. The front room light may be turned off and on by a switch in the first floor back hall.

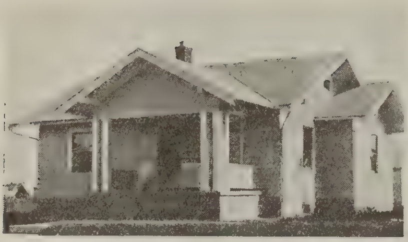
One of the five-room houses in the Studebaker development. Every house in the development is equally attractive

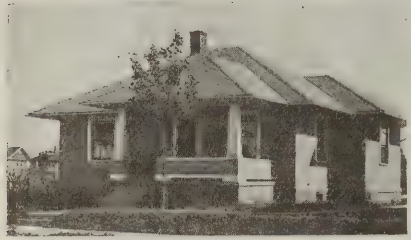
A wall switch at the foot of the stairs leading to the second floor controls a single unit ceiling fixture in the second floor hall. In each second floor bedroom there is a single-unit ceiling fixture, wall switches and a wall bracket. The bath has a wall bracket on either side of the mirror with wall switch.

This development was designed by N. R. Shamblau, architect for the Studebaker Corporation. The houses were built by the Citizens Homes Co., an organization formed by the Studebaker Corporation for that particular purpose. Fifteen hundred modern homes were provided for. They vary in size from three to seven rooms and of the one and two-story types.

Thirteen basic plans were developed for the bungalow types, having sufficient variation to provide 38 distinct types of bungalows. Eleven basic plans with exterior variations made 66 different two-story types possible. In other words, 104 distinct types of houses were possible from 24 basic plans. The types of construction used are, stucco on concrete, structural tile, stucco on wood lath, stucco on clay tile, frame and brick veneer.

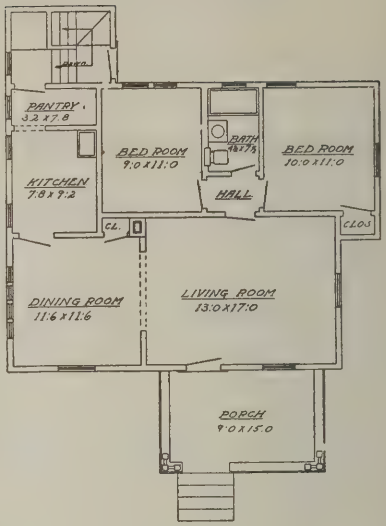
These houses are sold to employees without profit, on either a ten or fourteen-year plan. When the ten-year plan is chosen, the company pays taxes and interest for the full period. When the fourteen-year plan is chosen, interest and taxes are paid by the





ANOTHER HOUSING DEVELOPMENT

THESE are some of the one-story houses in the Robbins and Myers development. Above is a clapboard and below is a stucco type. Both of these exteriors have the same floor plan which is shown at the right. The arrangement of the rooms isolates the bedrooms from the rest of the house



company for the first ten years and by the purchaser for the remaining four years.

On this page is shown the plan of a bungalow type of house built by the Robbins & Myers Co. at Springfield, Ohio. This is but one plan of a number used by that company in building houses for their employees.

This development likewise provides for one and two-story houses, consisting of various types of exteriors constructed upon one of a number of basic plans. The illustrations show one of these plans applied to two different exteriors of the one-story type. Clapboard and stucco construction have been used extensively in this development.

These houses are sold to employees at cost and on remarkably easy terms.

Success vs. Failure

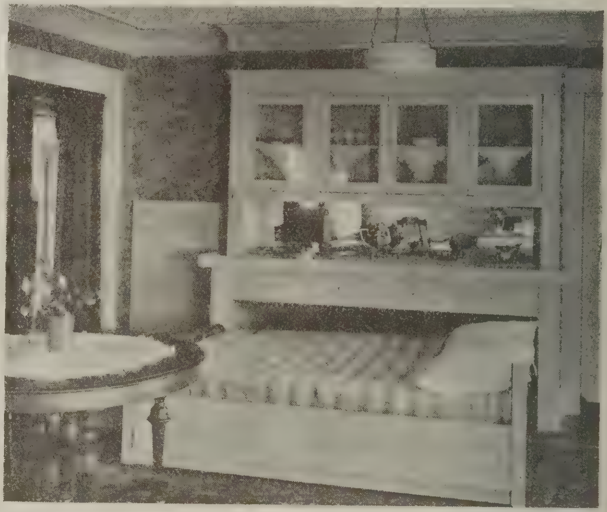
A MOTTO in Judge Elbert H. Gary's private office reads:

Success comes in Cans
Failures in Can'ts.

This motto has worked in the case of the man who has risen to be the head of the largest enterprise in the world. How about you?

Combined Buffet and Bed

HOW a bed may be built into a buffet is shown in the picture below. When closed the buffet presents the appearance of an ordinary piece of dining room furniture. At night the bed may be pulled out in much the same way as a drawer. It has the advantage of providing a spare bed without the necessity of an extra bed room.



The Buffet-Bed helps make the small apartment bigger

How To Construct a Store Front

Modern Store Fronts Designed by Trained Experts with View to Arresting Attention and Most Effectively Presenting Goods on Display

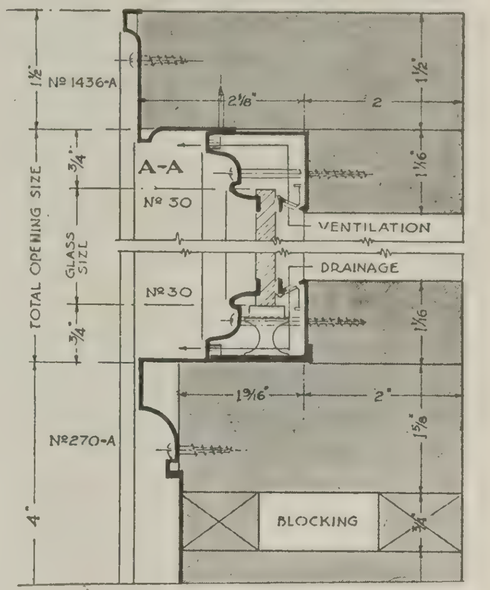
THE store front that converts the passerby into a customer is the successful store front. Merchants realize this fact, and for that reason are taking pains to get experienced help in building this part of their shops.

The illustration shown here is a sketch of a front that has been particularly successful with stores handling men's and women's ready-made wear, although it may be well adapted also for high class shoe, sporting goods, stationery and other displays.

By virtue of the shape of the entrance it presents to the passerby a maximum display for a small frontage, thereby increasing its appeal and bid for the trade. The roomy side cases are intended for the effective display of more bulky articles, figures, etc., while the center case is for smaller trinkets and extends back of the store line so that it is visible from inside the store as well.

Two doors with side lights help light the store and provide a roominess and ease of entrance or exit that is desirable. When it is necessary to have natural light in the basement the floor of the show window may be raised to allow for glass windows below the floor line.

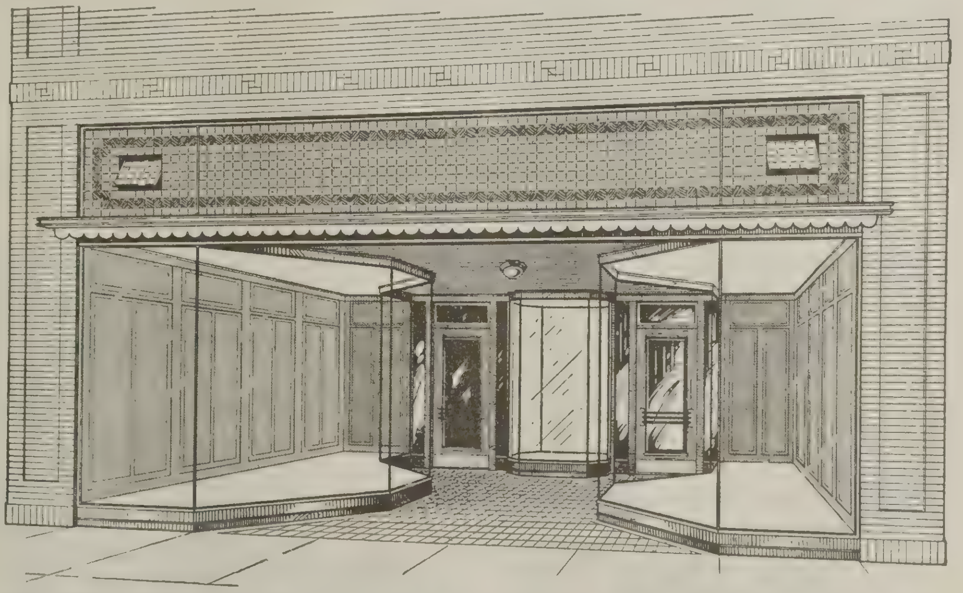
These fronts consist of rolled metal shapes which are screwed to wood backing as shown in the typical vertical section.



VERTICAL SECTION

Showing method of mounting metal shapes on frame

At the bottom, top and sides the plate may be held in a firm resilient grip between the spring faces of two metal members. Ventilation and drainage are provided for by holes in the metal. In the winter, the air may thus be brought to the same temperature inside the show window as outside and reduce the frosting of the glass. The glass inside rests on a leather cushion and that in turn upon a solid wood block. The whole may rest on wood, metal, marble or stone.



The design of this type of store front is well adapted to a men's or women's ready-to-wear shop. The display can be made attractive and effective with a front of this shape

There are so many niceties in connection with the design of the successful store front—niceties of layout and construction—that it has become a business in itself and is handled by experts who make it a special study.

How To Lay a Brick Bay Window

Suggestions for Laying Sills, Jambs and Lintels to Give Permanency with Minimum Chipping

THERE are many ways of building bay windows in brick, and one of them is shown in the accompanying illustration. This method is intended to reduce cutting the brick at the corners without sacrificing any neatness in appearance.

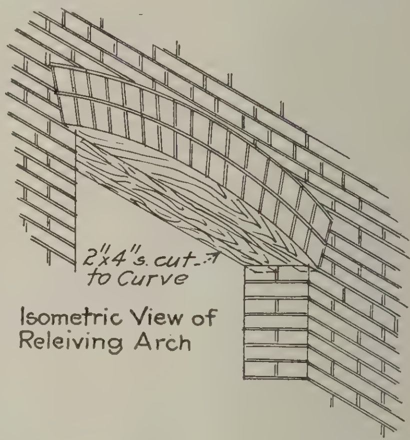
In the sills, the brick should be laid on edge and pitched outward so as to shed water. This is more satisfactory than to lay the brick on edge and form the pitch with mortar because the action of weather and frost soon causes the mortar to loosen. Always allow the brick to project beyond the face of the wall, to form a drip.

It is the carpenter's job to set and plumb the window frames. He should also brace them in such a way that the braces will not later interfere with the bricklayers. A few bricks piled on the sill will help to keep the frame steady. Where this has not been done, the bricklayer should do it himself before commencing to brick in. If the frame is high, cross-pieces should be nailed on the frame to prevent the window being bowed in.

To form a relieving arch over the window, as shown in the sketch, cut two pieces of 2 x 6 to the shape of the arch and lay them over the opening. The bricks are laid over these permanent centers in 4½ inch rowlocks. In laying the arch, it should be borne in mind that the rise should not be less than ¾ of an inch per foot of window opening.

If the radius of the arch is small it is necessary to chip the brick into a wedge shape when laid on end. This is not necessary when the bricks are laid on side, particularly if the arch is carefully laid.

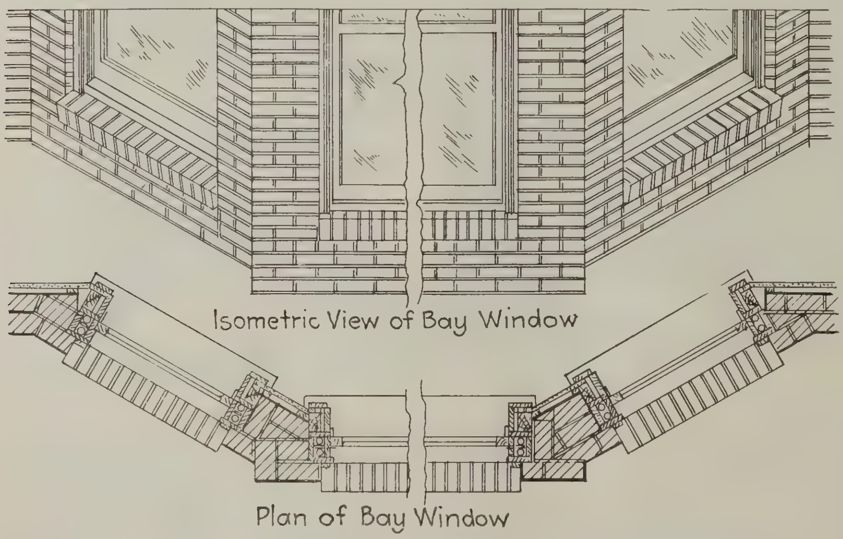
Showing brick laid on edge without chipping. Arch supported by 2x4 cut to fit radius



Where steel lintels are used over the windows, this construction is slightly more expensive than arches. They support only the outside four inch brick, while the backing is supported by a relieving arch or wood lintel. For openings not more than four inches wide, an angle lintel 4 x 3 x 5/16 in. and 8 in. longer than the width of opening usually has ample strength for support. This is only a rough guide, however, because it is evident that the weight supported depends on the height of wall. A row of brick on edge or a soldier course resting on the lintel is generally used with this construction. Considerable time is often saved by using specially shaped brick, called splay or octagon brick. They are manufactured for just such purposes as angles, bays and corners in brickwork.

Sills may also be of stone or precast cement.

Care should be taken to fill all spaces between brick work and frame to keep out wind.



Note that the brick of the sills slope outward to shed water. Note also the treatment of corners to reduce chipping of brick to a minimum

Porches, Day and Night

THE era of the porch is at its height. In mediæval days, when a house was a man's castle, the fortress aspect of the place permitted no place for the porch. The ancient porticos of the rich Roman house was a formal sort of thing that nowise suggested the structure of today.

The early New England houses were too cold to permit of an extensive use of the porch, and those in the south, built by wealthy slave owners, bore an air of aristocracy that frowned upon real physical enjoyment of the surroundings.

Today, with better building methods, with facilities for warming and cooling, opening and closing, lighting and altogether *living* in a porch, it has come to occupy an important place in the modern household.

There are sun porches, kitchen porches, dining porches, breakfast porches, sleeping porches—all of them with their own problems, but all of them with possibilities for beauty and service.

A picture shown here presents a small projecting balcony not much different from an alcove. It will be seen that the window of the room and the window at the bedside are in different planes. A clever pulley arrangement permits the occupant of the bed to control the windows from his recumbent position.

Sleeping porches should be built on the second floor of the house. Such a location insures greater privacy, and lessens possible annoyance from insects and odors. The sleeping porches should be open on three sides, but screened in summer with rust-proof screens and provided with double windows for winter. Floors should be treated to avoid leakage of rain below.

The windows of this porch fold together like an accordion, giving a full window opening. A winter porch is thus converted into a summer porch immediately. Such windows are a standard manufactured product

A unique sleeping balcony, looking from the inside out. The operation of raising the windows is easily accomplished by pulling the ropes. They lower of their own weight

A convenient plan is to build a second story sleeping porch above the first story veranda. This is known as a double-deck porch and many have found it convenient and inexpensive. Often such a porch extending at the side of the house in the form of a wing can be covered by the main roof of the house, making a pleasing appearance. This method usually makes a small house look larger and is quite popular.

A second story balcony may also be utilized. This is nothing more than a projecting porch supported on brackets or built on top of any flat part of the roof which may be available. It is also possible to use one corner of the second story, reserving just enough space for the number of beds to be accommodated. Such a porch, like an ordinary bed room, but smaller, may be fitted with wide openings or with rows of casement windows. When these are wide open, the room is in fact an out of doors porch but one that can be closed tight in bad weather. The exterior here shown is on this order and has casement windows that fold up like an accordion after a special patent, when not in use.

A built-in bed with large ventilating opening may be placed in a small recess in the wall during the day, but an ordinary cot bed is the most practical stationary bed for a sleeping porch. A waterproof spread should be part of the equipment. Screens in summer and storm sash in winter are desirable. The storm sash should not be fixed but movable, to admit fresh air. If a radiator is used, it should be twice the ordinary size and placed in an exposed corner of the porch. Many people do not consider their house complete without a sun parlor and a sleeping porch. Canvas and linoleum are peculiarly adapted to these as a floor covering in that they are practically waterproof and easily kept clean.

An enclosed porch properly constructed has many varied functions. It may happily combine out of door charm with indoor comfort. If it is amply provided with electric outlets, one may on warm summer days serve electric meals, have an electric fan, and other electrical comforts that will suggest themselves. Rustproof screens are also highly desirable in this connection.

A porch with pillars may be readily converted into a plant room for winter use simply by having sash or window frames made to fit betwen the pillars or posts and fastened with hooks or screws. They may be taken down in summer to restore the porch character and the sashes may be kept in the cellar or elsewhere until wanted. During the winter such an arrangement not only affords a good conservatory but at the same time helps to keep the adjacent rooms warm.

In planning a sun porch, there must be ample provision for sunlight, and facilities for watering flowers and plants, as well as for heating and temperature control. The plant room should be on the south, west or east side of the house, and should have easy access to the out-of-doors so that the plants may be handled without disturbing the rest of the house. A plant porch should project so as to have three sides exposed to the light and air. If it is of one story, light should also be admitted by a glass roof.

The interior of an all-year-around sleeping porch. Metal rust proof screens for durability have been a feature in such porches

Breakfast on a cheerful, airy porch is an enjoyable meal. Venetian blinds afford sufficient protection from the direct sun rays without shutting out air and light

The heating of a plant porch is an important factor in the success of the venture. The best way is to extend the main cellar under it. This furnishes a permanent foundation, warmth under the floor, and opportunity to introduce pipes for heating, watering and draining. The plant porch should have a tiled floor, with either a slope toward a central drain or a side one.

One Effect of Reduced Lumber Costs

Reduced lumber costs have begun to show their effects in the cost of the various kinds of building work that are built-up largely of wood and sold to the builder as a unit.

For example, the Lunken Window Company announces that increased production and decreased costs have enabled them to make substantial reduction in the price of window frames to the trade. These reductions are effective May 25.

The Wiring of the Home Electric

Suggestions for Location and Number of Outlets, Switches and Fixtures in Various Rooms of House

PROPERLY located switches for lighting eliminate searching in the dark and a number of extra outlets permits the use of labor-saving appliances without loss of time and without disturbing the lighting arrangements.

In locating baseboard outlets and plugs, to connect fixtures with the current supply leads, they should be distributed about the room so that there will be an outlet near every point where it is likely a lamp or other attachment will be desired. It often happens that otherwise an easy chair or small table is fettered to one position when one would want to move it because it is not possible to connect the portable lamps at a convenient proximity to the new position.

One should *not* place these outlets in the middle of broad wall spaces where the heavy furniture will stand. Many a needed outlet is covered up in this way and made unavailable.

Floor plugs should be set flush with the floor. The table under which the plug is originally installed may some day be moved and if the outlet plate is raised ever so little, people will trip over it or it will make a worn place in the rug.

The reasons for urging numerous outlets are twofold. They serve to distribute the demand for current on separate circuits to avoid overloading, and they prevent long cords from disfiguring the room and getting in the way.

With these things in mind the following outlets are recommended:

Living Room—1. Ceiling lights. 2. Outlet for electric fan or heater. 3. Outlet for vacuum cleaner. 4. Outlet for floor lamp. 5. Outlet for table lamp, cigar lighter, etc. 6. Outlet for electric player piano. 7. Outlet for piano lamp. 8. Outlets for lights on mantel.

Let it be understood that alterations to admit of these things may be made, and it is much better to make them than to go without. No one, however, should build anew without thoughtfully considering the wiring first.

Dining Room—In addition to the central lighting fixture from the ceiling, wall switches are desirable (1) at the main entrance to the dining room and (2) near the kitchen or pantry entrance so that lights may be controlled from either position. (3) A floor outlet under the table permits the use of cooking appliances without reaching up or disconnecting any of the lights. (4) A connection plate may also be placed at the edge of the table for further conveniences such as a kitchen buzzer if desired. An extra outlet (5) in the baseboard near the window is a good location for the electric fan or heater and still another (6) for the vacuum cleaner near the entrance. Finally (7) near the buffet, outlets will make it possible to cook on the buffet.

Among the labor-saving devices in this room may be mentioned the electric toaster, the percolator, the samovar, the grill, the plate warmer, the chafing dish, the waffle iron, the egg boiler, all of which commend themselves for helpful service.

Kitchen—In the kitchen where much work must be performed before dawn and after dark, lighting is an important feature. The central ceiling light is not enough. There should be a special light over the sink so that one need not work in shadow, and the kitchen cabinet which is perhaps the center of activities, should also be lighted. A double outlet should be provided near the sink for the dishwasher which remains attached, and for connecting the utility motor which works the coffee grinder, cake mixer, cream whipper and other things. The electric water heater must also be remembered. It is well to have a telephone extension in the kitchen so that the housewife need not leave the room at inconvenient moments to answer it. An intercommunicating house 'phone also serves a good purpose and this should likewise connect with the kitchen.

Two-way plugs are extremely useful. If one needs to use the electric light socket say, for the ironer, it is not necessary to put the light out to use the iron. A double-duty socket permits both to operate at once.

The electric fan has a peculiar and useful mission to perform in the kitchen. When preparing onions, for instance, which is in one sense a "delicate" operation, one may turn on the fan and blow the fumes away, making said onions quite harmless. Seriously, it may be used in helping to dry fruits, to keep the air pleasantly circulating, to aid in ventilating, and for other good purposes that will suggest themselves.

Wardrobes—Very slight expense is needed to add endless comfort to the upstairs rooms of the house by electrical aids. For instance, closets and wardrobes that are used every day need no longer compel groping for things in the dark. A light should

BED ROOM

In the "Apartment Electric" the hair drier is a time saver for the housewife. Evidently she has just finished a dress for little Hope's first party on the electric sewing machine. The boudoir iron is waiting on the bureau to press out the little frock.

DINING ROOM

Informal meals are so delightful, because the hostess, with her electrical table accessories, need no longer disappear every moment into the kitchen, in serving her guests.

LIVING ROOM

In the living room electricity adds to the joy of the housewife's social or "play" hours. Here tea and toast for the afternoon guest are conveniently made in the electric samovar and toaster.

NURSERY

A tea party's not a real tea party
kiddies, unless they've made real co
ies for it on their own electric ra
Even in the nursery of the electr
home, electricity plays an import
part—driving electric toys and,
course, heating the baby milk war
and the heating pad.

KITCHEN

After each meal, the housewife sta
the dishes in the electric dishwas
washing them only once a day, a
breakfast—without wetting a fin
The electric fireless cooker enables
to go a-visiting in the afternoon w
dinner is cooking. There is also r
for the electric clothes washer.

Courtesy Electrical Merchandising

be so placed that shoes and dresses can be easily recognized. Automatic door switches are very convenient, or a pull-chain socket saves much annoyance of this sort.

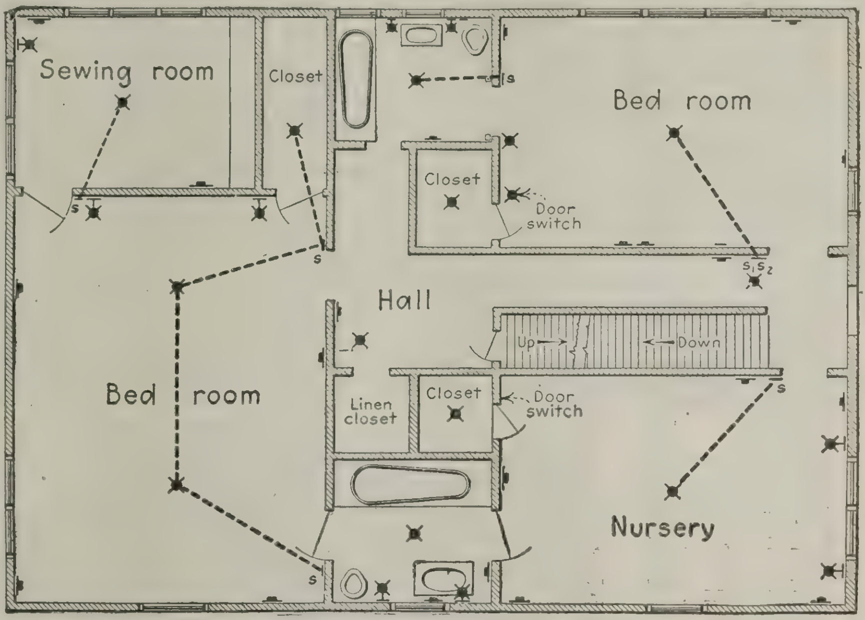
Bedrooms—There should be dimmers on one lamp in every bedroom as well as in bathroom, nursery and hall. It is particularly desirable to have a low light burning especially during sickness. Yet few households are equipped with this simple comfort or even know that electric light can be turned down. Every room upstairs, or anywhere in fact, should be fitted with radium balls on the pull chain of the wall bracket nearest the entrance. One of the economies in the use of electricity for light is the ease and safety of putting it out when one leaves the room. No one burns lights in bedrooms when they are not in use, and there is always groping for a light unless this little glow points the way directly to it.

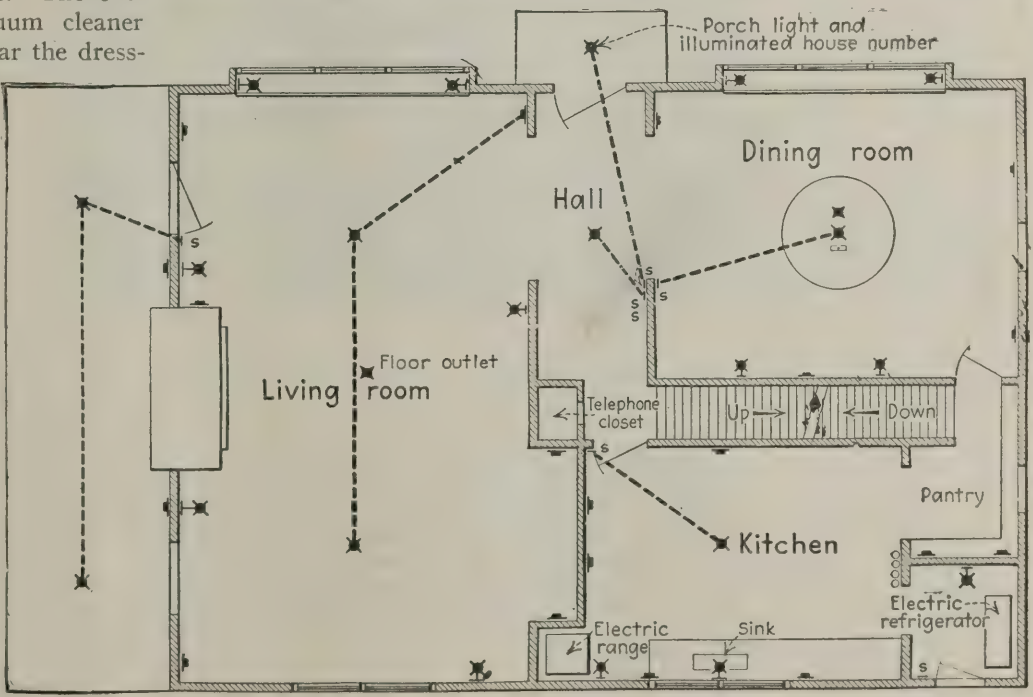
In every bedroom there should be installed a duplex receptacle in the baseboard beside the bed for the use of bedside appliances—reading lamp, heating pad and telephone. Another outlet for electric fan or heater should be placed near the dressing table. The outlet for the vacuum cleaner may be placed near the dressing table also that when it is not used for this purpose, the curling iron, vibrator and similar smaller pieces may be attached.

If there is no special sewing room, a plug should be devoted to the electric sewing machine here. Lights in the bedroom should be at either side of the dressing table, at such special places as desk and sewing machine, and a master switch controlling all the lights in the house is both a protection and a convenience.

Nursery—In the nursery, the radiator, fan, milk warmer, heating pad and immersion heater will relieve considerable mental anxiety and physical work. One or more outlets will provide for these and the vacuum cleaner. Outlets for electric toys in nursery or playroom afford constructive and interesting additions to these parts of the progressive home.

(*Continued on page* 39)





A Small Theatre Well Handled

Details of Design That Make a Theatre with Small Frontage Attractive Outside and Comfortable Inside

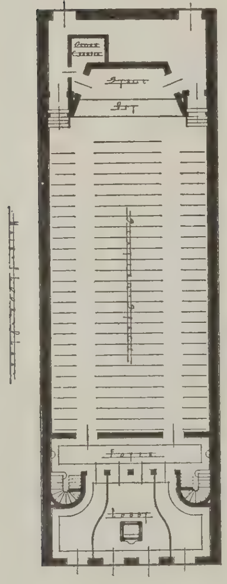
THE Orpheum Theatre, at Terre Haute, Indiana, presents a good example of a small theatre that has been well handled by the architect. The exterior face brick with raked mortar joints makes a particularly pleasing appearance in this type of building.

The white wood trim on the doors, shutters and dormers is in good contrast to the darker brickwork and an additional pleasing effect is produced by the ornamental stone work over the doorways, windows and capping the brickwork.

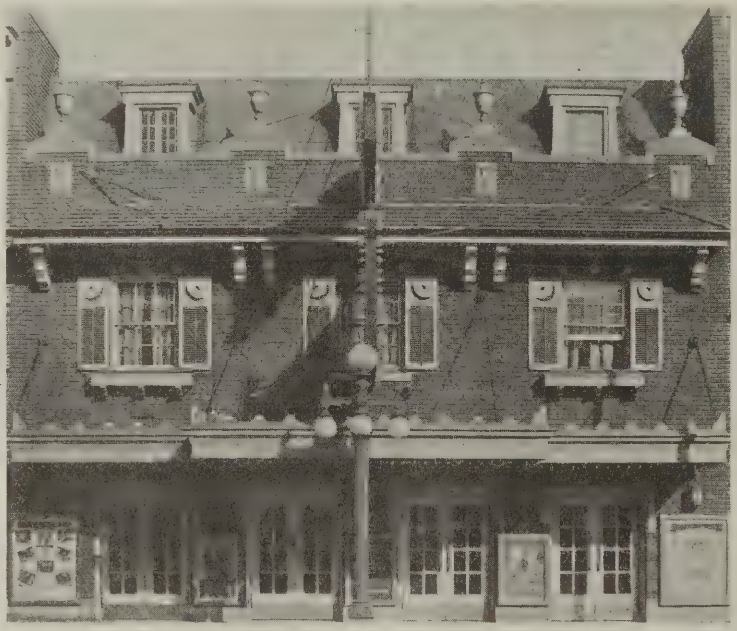
The windows, shutters and little false projecting roof lend a comfortable homely atmosphere that the small theatre certainly should have.

A suspended roof over the sidewalk gives protection from the weather to those who are waiting for the "second show" and ample lights on the under side give the "Great White Way" effect that has become associated with theatres. Not so prominent, but quite artistic, are the lanterns hanging from the brackets at the sides of the doorways.

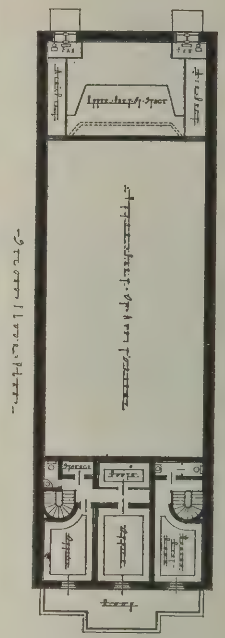
There is seating capacity for 500 people as shown in the ground plan of the building. Stairways at either side of the entrance lead to the toilets, offices, women's rest room and operator's booth on a small balcony above the entrance. Ventilation is induced by two large motor-driven fans placed above the stage on either side at the rear and drawing air from the auditorium through metal ducts as shown.



Plan
Main Floor



ORPHEUM PICTURE THEATRE, TERRE HAUTE, IND.
Johnson, Miller & Miller, Architects



Plan
Second Floor

HERE is a good example of a small moving picture theatre that makes an inviting bid for patronage, because its exterior is attractive, home-like and comfortable. The metal canopy with its myriad of lights and the swinging doors and billboards are indicative of the theatre, while the treatment of the upper part of the exterior is a pleasing contrast to the ordinary method of handling this type of building.

HOUSE OF J. G. MAC ARTHUR, ELMHURST, ILL.

How to Build Stucco Houses

The Five Cardinal Points to Be Observed

By Wharton Clay

IN taking advantage of the adaptability of stucco to varied design, the danger arises that other considerations may be sacrificed. And this in fact is exactly what occurred in some of the Own Your Home, small house competitive designs.

Immediately after all the drawings had been examined by the jury of awards, graduate architects were detailed to make a careful analysis of each drawing and report on any violations of good stucco design as recommended by the American Concrete Institute committee on the Treatment of Concrete Surfaces, of which J. C. Pearson of the U. S. Bureau of Standards is chairman.

The "cardinal points" embodied in these recommendations have been for convenience classified under five separate heads, and, although builders very likely are already familiar with them, they are here enumerated:

(1) Stucco should not be run down to the ground without a solid impervious base course.

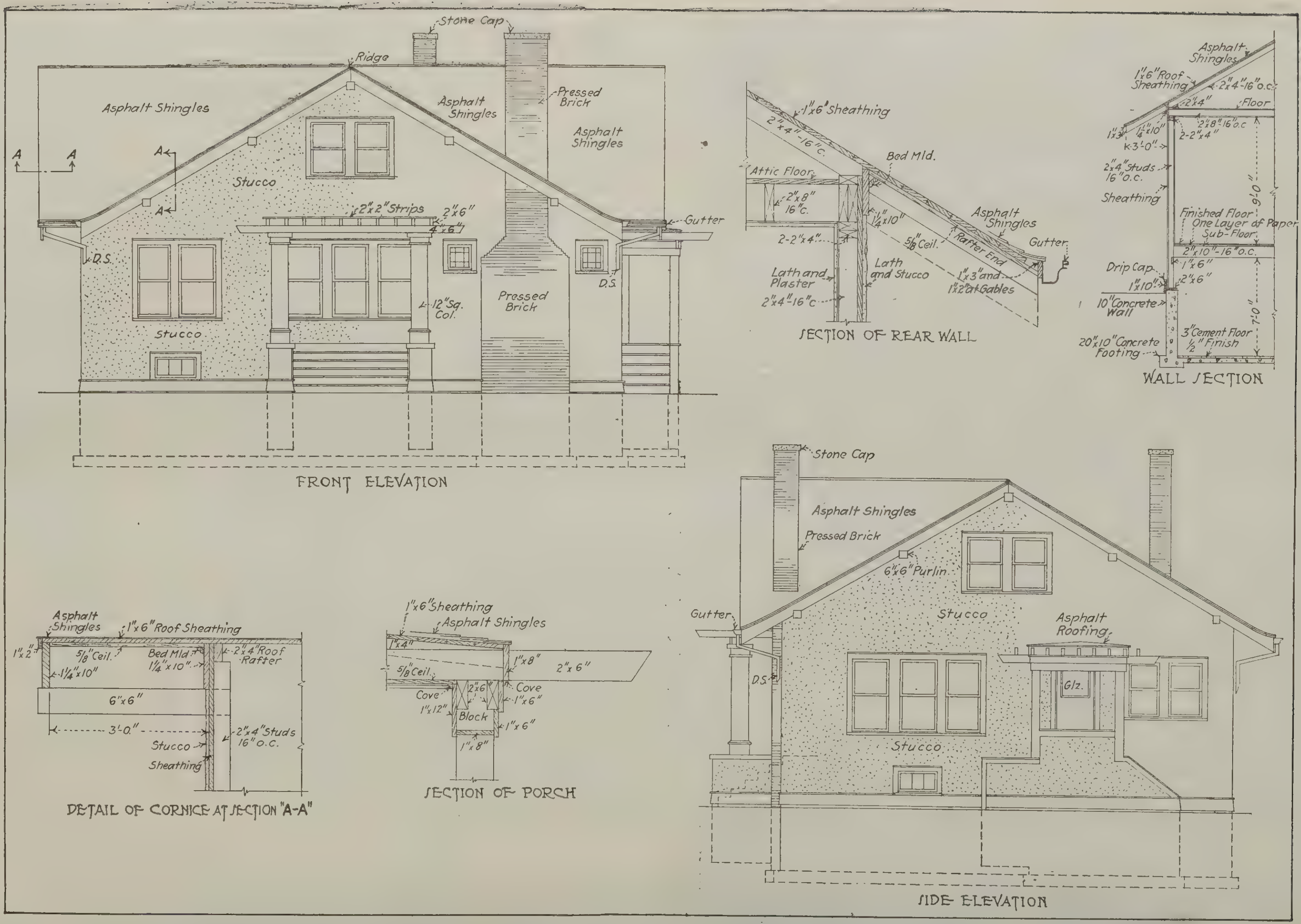
(2) The proper overhang and drip should be provided for all window sills and other horizontal woodwork, and some stop should be provided at the ends to avoid the concentration of water over end of the sill.

(3) The design should be chosen permitting a generous overhang of eaves and cornices.

(4) There should be no horizontal surfaces of stucco on which water can collect. Liberal and intelligent use of flashings should be made wherever water might get behind stucco—such as roof and wall intersections, underjoints of masonry trim, etc.

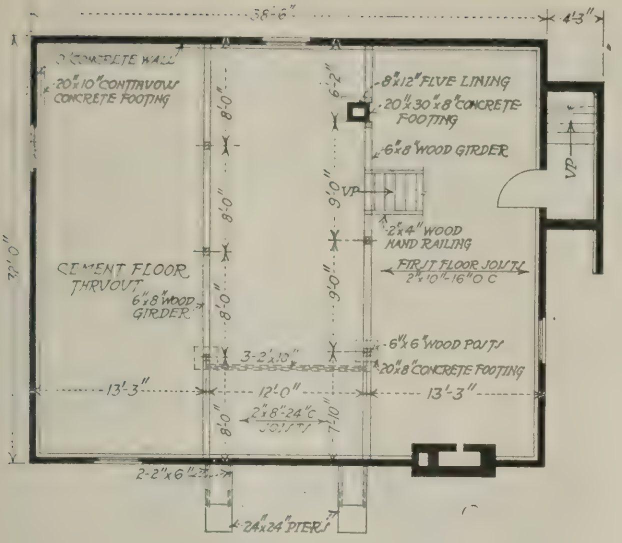
(5) Some impervious chimney cap should be provided avoiding unprotected stucco at top of chimney. Chimneys should be surrounded by metal lath before stuccoing. Sheathing should be eliminated and metal lath back-plastered according to the findings of the U. S. Bureau of Standards.

If the design is such as to make it necessary to carry the stucco to the ground, it should be on solid backing such as provided by brick, tile, stone or concrete, any of which, if carefully set with good mortar, will provide a reasonably impervious base for the stucco. However, this practice is to be avoided wherever possible, and in its stead the design should show the stucco stopped at least six inches above grade. It should here be anchored to a solid base



ELEVATION AND DETAILS—HOUSE OF J. G. MAC ARTHUR, ELMHURST, ILL. SEE PAGE 37

Note to what extent the five cardinal points for good stucco design have been observed by the builder. The eaves extend three feet beyond the outside walls and the stucco is not permitted to run to ground level



BASEMENT FLOOR PLAN

of brick or concrete by extending the metal lath down over the face of the base and stuccoing, forcing the stucco through the lath to make an intimate bond with the base. With back-plastered metal lath and stucco this method is generally used and gives very satisfactory results.

Furthermore, stucco is frequently stained by dirt or vegetable accumulations. The naturally pleasing and beautiful effects that are produced by stucco will of course be marred by such discoloration, and it is sure to occur if the stucco is run to the ground.

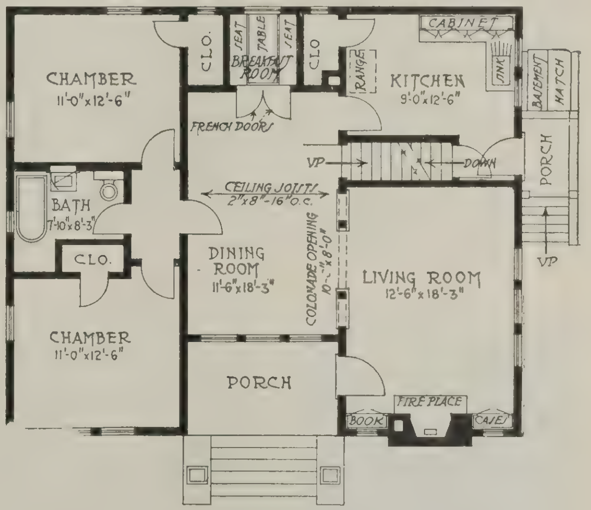
Builders should be sure to provide an overhanging roof or similar projection whenever the design permits, and stuccoed copings, cornices, and other exposed horizontal surfaces should be avoided whenever possible. Windows and other horizontal wood work should be provided with ample overhang and drip, and windows should also be provided with a stop at the ends of the sills to avoid concentrated flow here.

To give interior protection to stucco, suitable flashing should be provided over all door and window openings wherever projecting wood trim occurs. Wall copings, cornices, rails, chimney caps, etc., should be built of concrete, stone, terra cotta, or metal with ample overhanging drip groove or lip, and water-tight joints. Continuous flashing, with a projecting lip to extend beyond the stucco, should be provided under brick sills, and should be so installed as to insure absolute protection against any interior leakage. Also, a two-inch strip should be provided at the intersection of walls and sloping roofs and flashing should be extended up and over it, the stucco being brought down to the top of the strip.

Ample protection should be given chimneys. This is best provided by specifying an impervious chimney cap to protect the stucco at its top. And, furthermore, it is good practice to surround the chimney with metal lath and stucco. The stucco should be forced through the metal lath, giving the metal lath an opportunity to act as a reinforcement to take up the stresses due to the heating and cooling. It is these stresses that cause chimney cracks.

It is well to remember that stucco should never be placed horizontally where there is any likelihood that it will be exposed to rain or snow.

Projecting horizontal surfaces, such as at water tables, belt courses, and the like, should be capped by impervious material. It is better, however, to alter the design so as to provide sufficient slope for the water to drain quickly off these surfaces.



FIRST FLOOR PLAN

Wiring of Home Electric

(*Continued from page* 35)

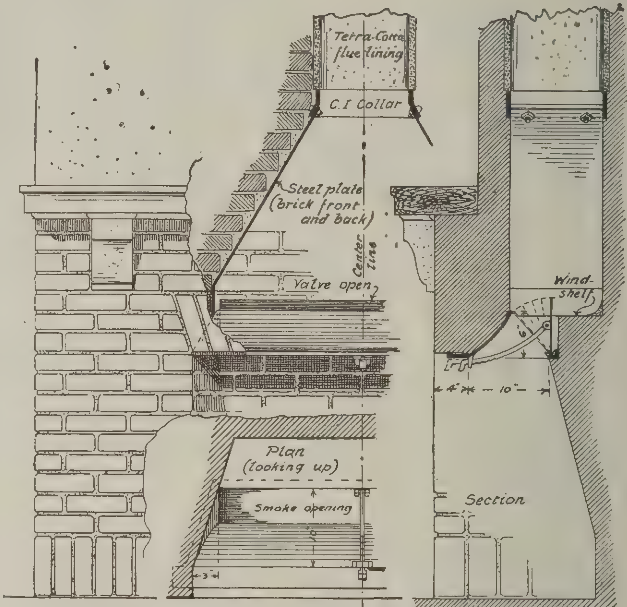
Bathroom—Even the bathroom has its quota of comfort-giving power if outlets are provided. There should be a bracket light at each side of the mirror so that the man who shaves will have light on both cheeks. A wall outlet for hair drier, vibrator, hot water cup, immersion heater, fan or radiator and similar devices should also be provided.

Fire Place Construction

Kinks That Help the Builder in Making Fireplaces Durable and Smokeless

IN OLD HOUSES the fireplaces that stood for years closed up with boards and possibly papered over, as things to be put out of sight, have been opened up, furnished with andirons and enjoyed as one of the chief delights of the house. In new houses one or more fireplaces are generally provided and even the speculative builder now realizes that his houses will be more salable if provided with genuine wood-burning fireplaces instead of the sham affairs that were considered all-sufficient a couple of decades ago.

It is unfortunate that fireplaces sometimes prove unsatisfactory because they have not been properly built. The flue may not be correctly proportioned to the size of the fireplace opening, the throat construction and smoke-chamber may be faulty or the flue may be clogged by mortar or rubbish at some point. A little careful attention, on the part of the builder, to these important points would produce the successful fireplace—as great a joy as the unsuccessful one is a disappointment.



Sectional Views Showing Method of Construction

Attractive fireplace design in tapestry brick. Concrete designs are equally artistic. Brick and concrete may be combined to advantage

It is considered good practice today to install an iron throat and damper, acting as a lintel to carry the masonry above and securing a proper formation of the throat as wel as giving control of the draft at all times. A steel form for the smokechamber may also be used to advantage, making it easy for the mason to construct his smoke-chamber and giving smooth surfaces to lead the smoke and hot gases into the flue.

The cut showing sectional view of a fireplace illustrates what is generally considered the best form of fireplace construction, with the use of an iron throat and damper and steel smoke-chamber.

Brick and concrete seem to be the logical materials for building fireplaces and it is surprising for how small a sum a delightful and thoroughly artistic fireplace and mantel can be built out of some of the beautiful texture bricks.

Two-Family Houses Are Popular

TWO-FAMILY houses are enjoying popular favor today. That builders have been quick to sense this situation is indicated by their ready response to the demand. What is the reason behind this demand? Why will two-family houses sell quicker than the one-family type? Let us see.

Assume a plot of ground 30 x 100 in the average town or city suburb. Suppose a six-room one-family house, half stucco and half frame to be erected thereon. What would it cost?

In the vicinity of New York City, the cost to the buyer may be itemized as follows:

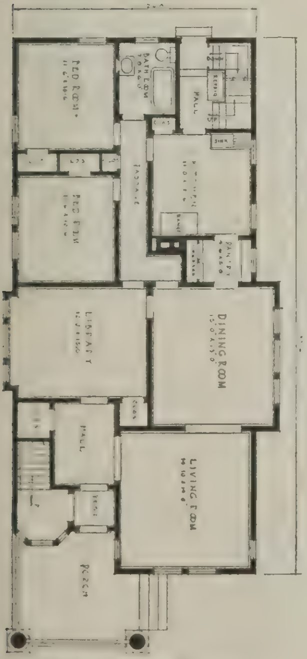
Excavating and grading	$384
Masonry—footing, foundations, chimney, cement work, etc	960
Plastering exterior	640
Plastering interior	560
Lumber, mill work, carpenter work	6,000
Hardware	283
Painting, staining, tinting, etc	576
Metal work	240
Plumbing, gas fitting	640
Heating	720
Electric wiring and bell work	128
Lighting fixtures	96
Extras	70
Total	$11,297

What would such a house have to rent for to pay expenses and interest, etc.?

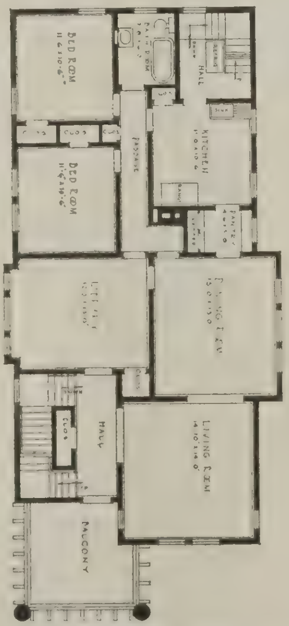
Interest on $11,297 at 6 per cent	$677.82
Taxes on assessed valuation ($9,000 at $2.81)	252.90
Insurance	20.00
Coal	150.00
Repairs	150.00
Amortization	564.85
Total yearly rental (or $150 a month)	$1,815.57

Now $25 a month per room is a lot of money and many of the buying public have sought for a more practical solution to the problem of providing living space at moderate cost. Five and six-room flats can be attractively and conveniently arranged to afford comfortable housekeeping facilities. If the owner occupies one floor the income obtained from renting the other floor often pays for the taxes and upkeep of the house and practically gives the owner rent free. It accordingly offers a better field for investment than the single house.

Illustrated with this article are two two-family houses. Each provides six rooms per family and will cost about $17,000. For purposes of comparison with the one-family house we have estimated the cost to build one of these two-family houses, half



Plan First Floor
Six rooms and bath



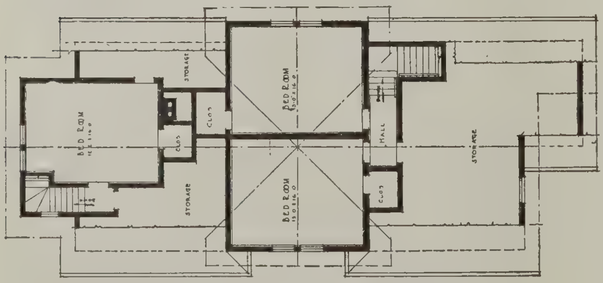
Plan Second Floor
Also with six rooms

A Two-Family House in Paterson, N. J.
Charles H. Benjamin, Architect

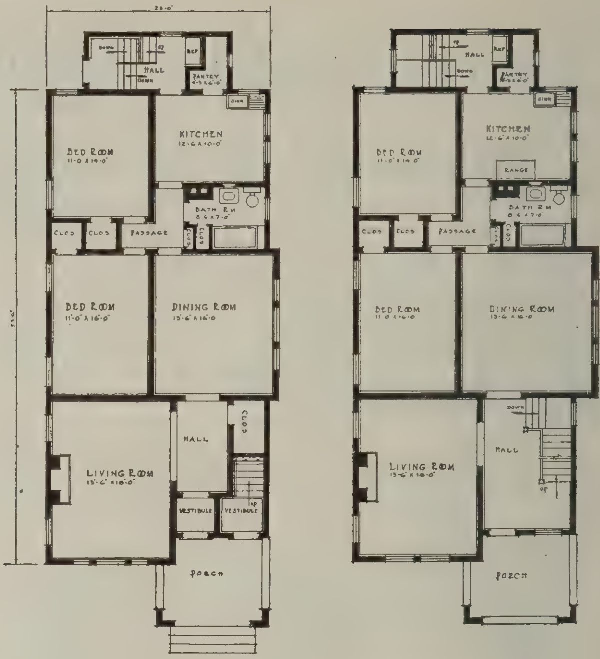
Another Type of Two-Family House
Paterson, N. J.
Charles H. Benjamin, Architect

stucco and half frame. These costs include the builder's profit and are really selling values as follows:

Excavating and grading	$576
Masonry-footings, foundations, chimney, cement work, etc.	1,440
Plastering exterior	960
Plastering interior	840
Lumber, mill work, carpenter work	9,000
Hardware	550
Painting, staining, tinting	864
Metal work	360
Plumbing, gas fitting	960
Heating	1,080
Electric wiring and bell work	192
Lighting fixtures	180
Extras	100
Total	$17,102



Third Floor Plan
The third floor of the house shown above is finished off and is used by both first and second floor tenants



Plan First Floor
Plan Second Floor
Third floor plan is shown below

The earning power of such a house must be:

Interest on $17,102 at 6 per cent	$1,026.12
Taxes on $13,600 at $2.81	382.16
Insurance	25.00
Coal	300.00
Repairs	250.00
Amortization	855.10
Total	$2,838.38

or a total of $236 a month. This corresponds to a monthly rental of $118 for each family, or $32 a month less than for a six-room one-family house.

Suppose the owner wishes to live on the ground floor and rent the second floor. Six-room apartments of this nature bring from $100 to $200 a month in New York City depending upon the location, etc. Say that he gets the average or $150 a month, $1,800 a year. The interest, taxes, insurance and repairs of the whole house amount to $1,683.28.

Interest	$1,026.12
Taxes	382.16
Insurance	25.00
Repairs	250.00
	$1,683.28

Add to this a yearly allowance of $150 for coal which he must furnish to heat his tenants apartment and we find his income of $1,800 a year his actual cash expenditures of $1,823.62. Thus he gets his own floor rent free and his only cash expense is the coal bill for heating his own floor.

How to Veneer a Frame Building with Face Brick

Modern Methods for Veneering Frame Construction Both New and Old—Rebuilding an Unsightly Porch with Brick

THE application of face brick to the wooden framing of a house in place of clapboard or over the clapboard, gives a construction favorable for speed and economy as compared with solid brick. To all outward appearance, however, the house is solid brick.

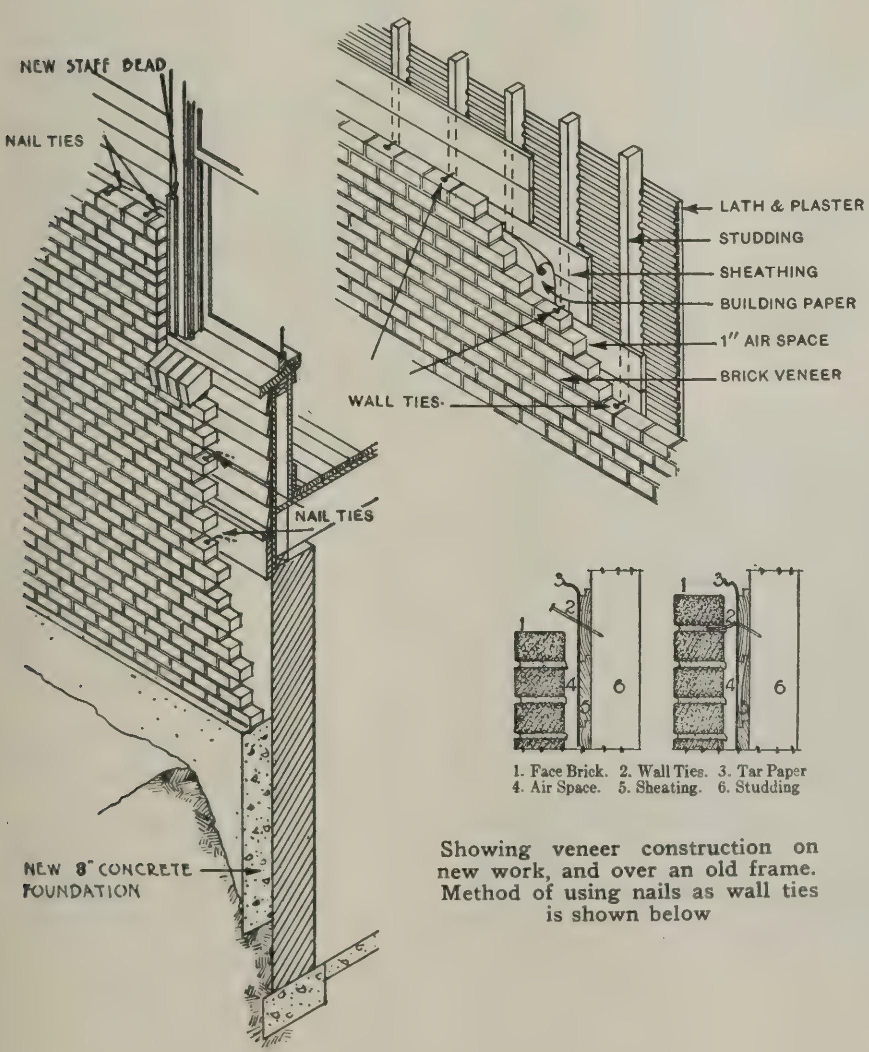
The studding is set back of the wall line, allowing sufficient space for the sheathing and brick veneer. After the studs are set the sheathed surface is covered with building paper, held in place by 2″x1″ or 1″x5/8″ furring strips. These are laid either vertically or horizontally over each lap of paper and once between.

Set the face brick one inch from the sheathing and lay them in the same manner as when facing a solid masonry wall.

Metal ties are used to bind the wall to the frame work. These ties are spaced horizontally on every stud and vertically every four or five courses. Corrugated metal strips may be bought from the manufacturers and used with one end nailed to the sheathing while the other is laid in the bed joints. Or, 30-penny nails are driven through the sheathing into the studs projecting sufficiently to extend at least one inch into the brick work. This latter method is substantial and permanent, if the nails are driven with a slant into the wood and at a point above the brick, so that when tapped they may be brought down to the level of the joint.

For window sills, the inner ends of the brick must be cut to fit against the sheathing. In other respects the construction is identical with that for solid masonry. Window and door frames are set as in frame construction and the brickwork over the openings may be carried on arches or steel angle lintels. The steel angle is usually used for this purpose.

Porch walls and piers should be solid brickwork, faced on both sides. The construction of the chimney in the veneer house does not differ materially from the ordinary chimney. In outside chimneys, however, care must be taken to build them clear of the sheathing so as not to cut the frame construction.



1. Face Brick. 2. Wall Ties. 3. Tar Paper 4. Air Space. 5. Sheating. 6. Studding

Showing veneer construction on new work, and over an old frame. Method of using nails as wall ties is shown below

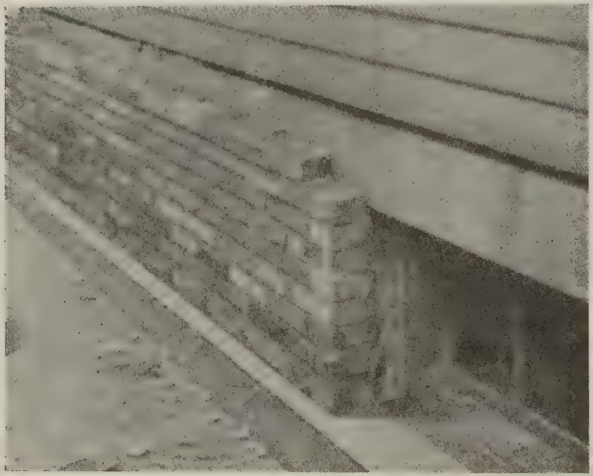
It is often desirable to rejuvenate old frame houses that have gotten into a state of disrepair or are out of date. This can be done very well by a veneer of brick.

Assume the framing of the house is sound. An 8-inch concrete footing should be placed against the outside of the existing foundation and be extended from grade to below frost line, resting on good solid soil. Starting from this footing the brick veneer is carried up with a one-inch air space between it and the old siding. The veneer is tied in the manner described above. It is not necessary to remove the clapboard siding.

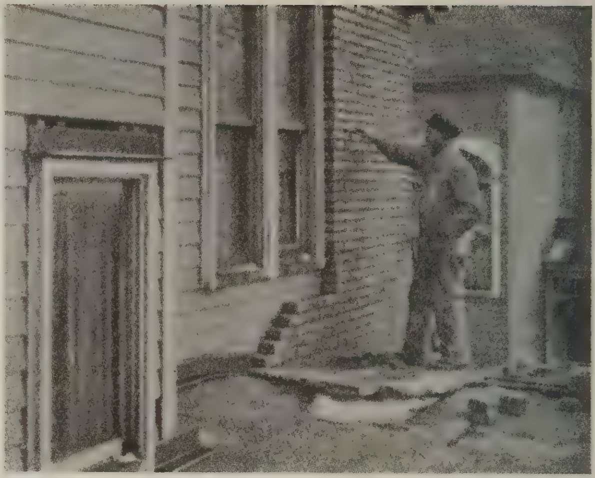
Steel lintels are generally used over windows and doors. Where the veneer is to be carried over porches or other low additions, the siding immediately above should be removed and a steel angle placed and securely attached to the studs by lag screws. No weight of the brickwork should be allowed to come on the roof.

The brickwork is laid up flush with the door joint or window trim, and quarter-round molding is nailed in the corner to make a tight joint. Similar moldings should be nailed at the under side of the roof, porch ceiling and other places where the brick meets the old frame finish.

Sometimes instead of rebuilding an old unsightly frame porch it is a simple matter to rip out the old frame, leaving the roof intact and supported in a temporary manner. A common brick foundation should be built to grade line for the piers and walls of the porch. The piers should be the same dimensions as the face brick piers above. The connecting wall should be 8 inches thick. Above the grade line the wall is finished with face brick on the outside and, above the porch floor, on both sides. At a suitable height there should be a coping of face brick laid on edge.



Starting to veneer over old frame. Note footing below and wall ties above



Veneering over a roof showing use of angles to carry weight of brick

The piers should be carried up to the porch cornice and finished with a course of brick on edge, projecting slightly to match the coping on the porch wall. Where the walls join the frame building they should be anchored as explained before.

Tomorrow's Landlord

"I put through a good deal this morning," said the landlord.

"What was it?" asked his friend.

"Well, I leased the basement of my building for a rathskeller; then I leased the lot for a hundred feet below that for a storage-cellar, and the hundred feet below that I leased to the Underburrow Co. for a subway station. And there's a man after me now for the hundred feet below that for a Turkish bath—say he'll pay a good rent, too, as he'll get his heat free."

"What with all that and your 50-story office building, you must make a mint of money out of your skimpy little lot," said the friend.

"Oh, that's not all," answered the landlord. "The hundred feet of air above my roof I lease to the Joy line of air freighters, and above that I get ground—I mean air—rent for the station of the London-New York Airship line."

Modern Plumbing Fixtures

Fixtures That Make Houses More Comfortable and Sanitary

THE progress in the manufacture of modern sanitary plumbing fixtures has made the old time bathroom look dingy by comparison.

A few years ago when the built-in bathtub was more or less new, it was looked upon as a novelty, but it is now winning a place for itself in many modern homes. Built-in tubs are about five inches lower than the older patterns that stood on legs. They are easier to get into and out of; there is no space underneath for dust to collect; and they save money, because it is unnecessary to tile the entire floor.

Many bathrooms today are equipped with a shower. If the room is large enough this is located in a separate compartment. If not, it is placed over the tub and provided with a curtain to prevent undue splashing of the water.

Frequently an instantaneous water heater accompanies such an installation because the hot water supply in the ordinary range boiler is more or less limited. This always gives instantaneous service whenever desired at a fairly constant temperature.

A wide variety of washstands is now on the market and they will satisfy almost every individual taste. For the better class of houses, the pedestal lavatory of enameled iron or vitreous china is in great demand. Often these are equipped with a combined hot and cold water supply fitting with separate control handles for the hot and cold. The mixed tempered water flows from the one spout, which permits the use of clean running water while washing. In more recent designs this spout is an integral part of the washstand, eliminating all exposed nickel work.

It should be remembered, when building a house, that the size of bathroom is going to materially effect the selection of fixtures. Where lack of space will not permit pedestal types, the wall-hung type with integral back is used.

Modern toilets are quite different from the former types. The operating mechanism is of the best quality of brass so as to be non-corrosive in water The tank and bowl are made of hand-fired vitreous china and the seats are often finished with a white that is guaranteed not to discolor or chip.

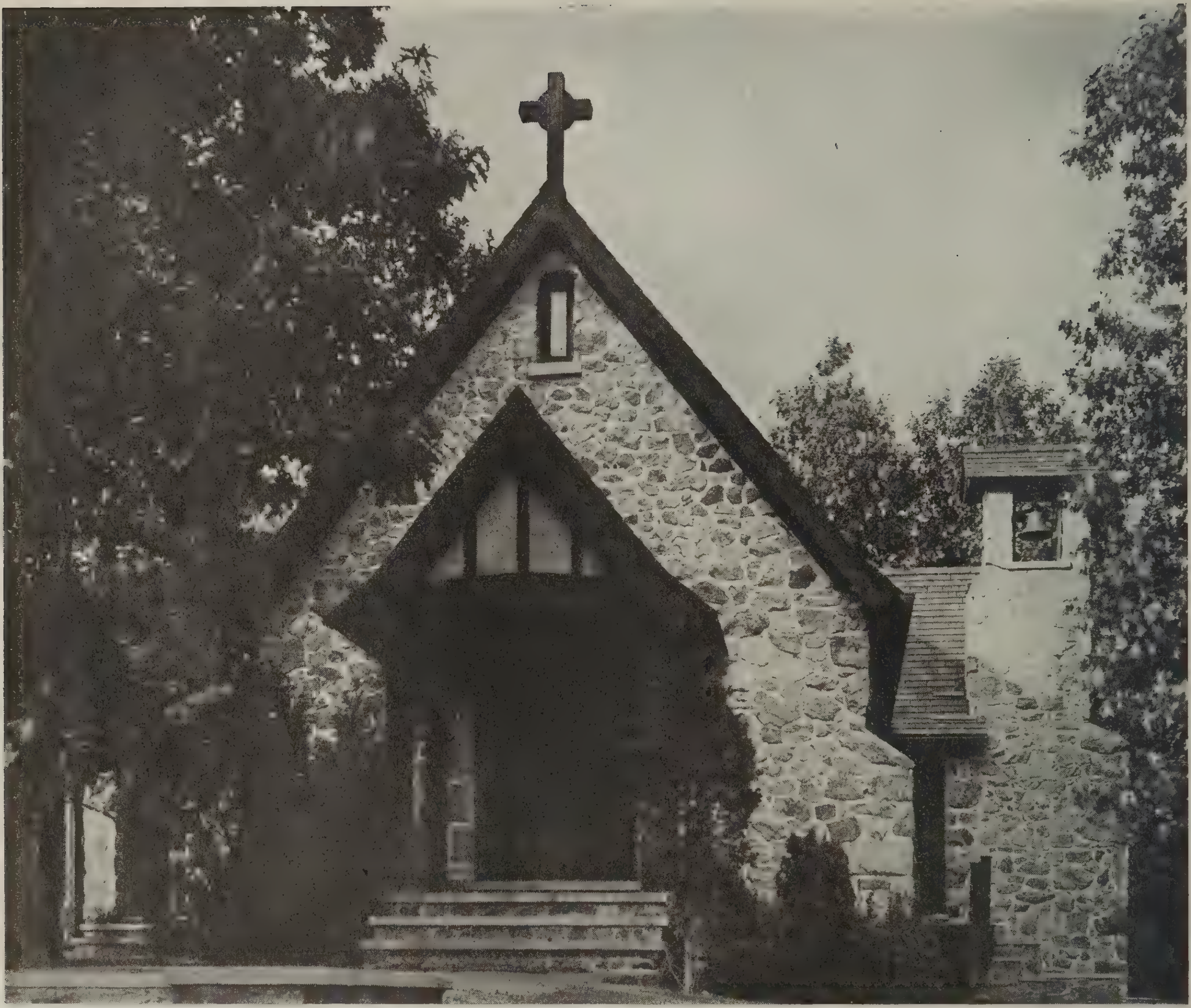
There is a great demand today for a one-piece kitchen sink, that is, the basin, drainboard and back are one. Often the ordinary kitchen sink is set too low, but many modern types may be adjusted to any height. This eliminates the back-breaking job of dishwashing at a low sink.

Drainboards are furnished on either or both sides and if a rubber mat is placed there the breakage of dishes is minimized. It is also possible to get a supply fitting of the swing type which allows mixed water to run through the one spout and which may be swung aside when not in use to permit of greater freedom while working.

Every laundry should have two trays at least. Modern types are made of white enameled iron or vitreous china and retain their color and finish indefinitely.

In every case it is essential to have plumbing fixtures installed by a competent plumber. A slight incompetence may endanger the health of the tenants. Manufacturers of plumbing fixtures stand ready to render assistance in the way of making suggestions, writing specifications and furnishing pictures of fixtures suggested. This service has often proved valuable to the contractor.

The interior of a roomy well-furnished bath room. Note the pedestal wash bowl, built-in bath tub and water control



The Sunday morning walk down the lane which has this for its goal, must be filled with serenity in contemplation of so restful and well set a chapel. Tucked away in a grove of trees, it needs to be sought as does the truth it teaches

A Countryside Chapel

ST JOHN'S Chapel at Bernardsville, N. J., was designed by Lord & Hewlett, architects. It was built without any further plans than a rough sketch in a notebook. Things of real beauty often take shape in this way.

The rough stone treatment is a picturesque and logical method of handling the subject, inasmuch as this stone was plentiful in the vicinity. Contrasting with the stonework is the dark oak trim. Such treatment produces a beautiful effect in a countryside chapel, rustic, picturesque and economical.

Note the gabled entrance, which has the same sloped roof as the chapel itself.

Placing the bell tower to the right at the side and covering the belfry with a small shingle roof, as has been done, is quite unique.

Note also the pleasing effect produced by the changed pitch of the roof at the eaves.

It is hard to imagine a prettier little country church than the one shown here.

Linoleum Floor Coverings

How Linoleum Is Made; Various Kinds Described; Where They May Be Used. Precautions Necessary in Laying and Caring for Linoleum

BECAUSE of its moderate cost increasing attention is being given to the European custom of employing linoleum as a floor for any room in any type of building, both dwelling and commercial.

Manufacturers have given serious consideration to present-day conditions, particularly to the increasing demand for a linoleum that is durable, sanitary, and sightly. For all installations where the artistic element is a factor to be considered, the conventional bath-room and kitchen patterns commonly associated with the term *linoleum* do not suffice.

Prevailing tendencies in modern interior decoration have been given careful study, with the result that the builder today now has at his command colorings and designs which enable him to select suitable linoleum floors for any type of structure that will please the owner without involving too great initial expense.

Linoleum takes its name from its principal ingredient, linseed oil (*linum,* flax, and *oleum,* oil). The oil is oxidized by exposing it to the air until it hardens into a tough, rubber-like substance. The oxidized oil is then mixed with powdered cork, wood flour, and various gums and color pigments, and the resulting plastic mass pressed on burlap by means of calenders. The "green" linoleum then passes into drying buildings called "stoves," where it is cured and seasoned from one to six weeks, depending on the thickness of the material.

The several varieties of linoleum are described as follows:

Plain linoleum has a solid color without pattern.

The colors of the inlaid linoleum pattern go through to the burlap. In making *straight line inlaids* the individual parts of the pattern are die-cut, laid in position, and finally keyed on the burlap under enormous pressure. In making *granulated inlaids* the designs are worked out on the burlap by means of metal "stencils." The loose "mixes" mould slightly into each other along the lines of the design, thus making possible very artistic effects in carpet inlaids and similar patterns.

This Linoleum Pattern Gives the Parquet Floor Effect

Showing How One Pattern Looks in a Bedroom

Inlaid patterns are also made to give the appearance of moire silk and a mottled effect like terrazzo.

Printed linoleum is simply a light grade of plain linoleum with a design printed on the surface with oil paint. Under ordinary use in homes, printed linoleum will give long service, and should the design wear away, the plain linoleum remains. Imitations of printed linoleum are made of felt paper, which, lacking the cork, linseed oil, and burlap foundation of real linoleum, tear easily and must soon be replaced.

The printed patterns include accurate reproductions of tile designs and wood patterns, as well as floral, carpet, and matting effects.

Cork carpet is a product very similar to linoleum, and is manufactured expressly for use in churches, theaters, or any place where a soft, sound-deadening floor is required, which at the same time will withstand heavy wear. The "mix" or compound of clean ground cork, oxidized linseed oil, and other ingredients is keyed to a burlap foundation by the same process as that employed in making battleship linoleum, except that the cork material is less firmly compacted; hence retains its natural elasticity to a greater degree, and possesses the softness and resilience of a thick carpet.

To be perfectly sanitary a floor must be non-absorbent, and must have a smooth surface, free from cracks. Laid properly, with tight joints a linoleum floor presents no lodging-places for dust or germs. The linoleum compound or "mix" is granular in structure—not fibrous; consequently it is free from capillary attraction. Furthermore, each particle of cork is well coated with the oxidized linseed oil in the manufacturing process. Hence the closely compacted composition is practically non-absorbent. In fact, the exceptionally long life of linoleum under normal conditions is due in no little degree to its ability to resist moisture.

Because of its smooth surface and freedom from cracks a linoleum floor may be kept sanitary at a minimum expenditure of time and effort. Occasional waxing and daily wiping with a mop or cloth ordinarily will keep such a floor in good condition. Constant scrubbing and refinishing are unnecessary. This is of special moment in large office buildings where the cost of floor cleaning and maintenance presents a difficult problem in the face of high labor costs.

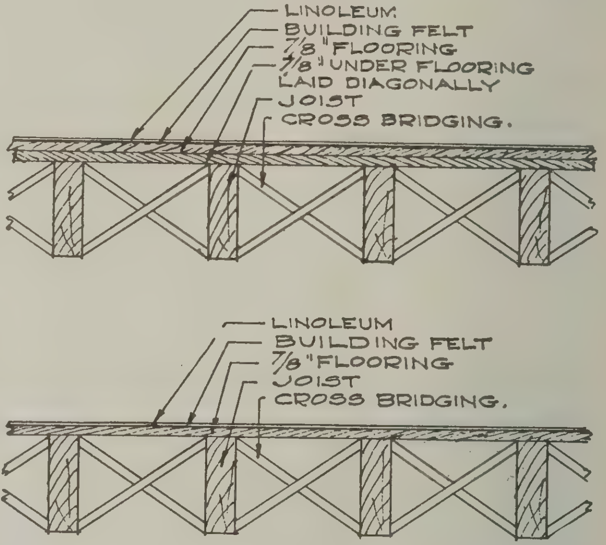
Floor Waxing Machine Saves Labor

For large installations, an electric floor waxing machine has been devised which materially reduces the expense of keeping linoleum floors clean and polished. A good floor wax is applied once or twice a month, depending on the amount of traffic. Each night the workman goes over the floor with the electric machine, which removes footmarks and puts the floor back in its original polished condition. In the twenty-six story American Telephone & Telegraph Building, 195 Broadway, New York, where practically every room is covered with linoleum, the use of this machine has materially reduced the number of employees formerly required to care for the floors.

In private residences also, where it is a problem to secure adequate help, the fact that linoleum floors are easy to clean is a point in their favor, as they undoubtedly lighten the labor of housework.

For comfort, a floor should be easy to walk on, quiet underfoot, free from odor, and not disagreeably cold to the touch.

The substances of which linoleum is composed are naturally elastic. The innumerable cells of the cork in reality form an air cushion that yields to practically every compression force exerted upon it. Thus linoleum absorbs the shock of footsteps, and gives the floor an agreeable resiliency that makes it pleasant to walk or stand upon.



Section Showing Linoleum Laid Over Typical Wood Floor Using Felt Paper

Because of their resiliency and elasticity, linoleum floors are quiet underfoot. They not only deaden the noise of traffic, but help absorb sound waves arising from other sources.

If properly laid and cared for, linoleum of suitable grade will wear indefinitely. Of course, in selecting linoleum for any purpose, the builder will consider the necessary thickness and weight with particular reference to the probable amount of traffic and use the floor in question will be required to sustain.

There is only one satisfactory way to lay linoleum as a permanent floor over concrete or wood, and that is to paste it down over a layer of heavy felt paper and seal the joints with waterproof cement. This adds to the cost, but the use of the felt layer positively increases the life of the linoleum and insures a permanent, satisfactory floor. When the many advantages of this method are explained to owners, few will be unwilling to pay the extra expense. In fact, the cost in the long run is less than where makeshift work is done, since the possibility of having to tear up and replace

(*Continued on page 60*)

Daily Time Sheet Form

Importance of Instant Knowledge of Material and Labor Costs—A Daily Time Sheet That Has Proved Valuable

By C. M. Cruikshank

CONTRACTORS in all the lines of the building industry are more and more realizing the importance and the necessity of keeping costs during the progress of the work. There are a number of reasons why this should be done: such as (1) keeping informed if the work is within the estimate or running over it, (2) a record to go by in estimating future work, (3) a record in case of law suits.

The basis of a cost system of any kind is a record of all labor used. This labor record should be accurate and complete as it is possible to make it. No payroll should be paid out until it is known what every dollar called for did. It should make no difference if one man or one hundred men are employed, the itemized record should be made with equal care.

The only way to get accurate information is by use of a daily time sheet for each job. This sheet should show the entire history of every dollar called for. It must be made out every night and mailed or sent to the office. If a daily report is not made there is no accuracy, for as a rule complete record of work can be remembered for one day only, the next day bringing another history of its own.

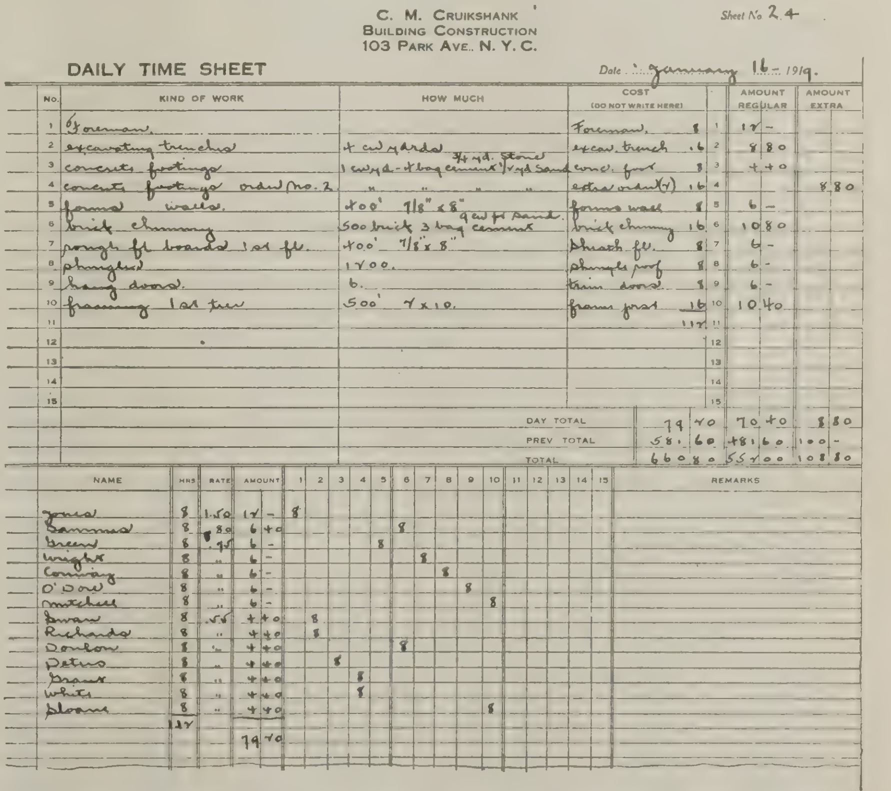
This time sheet must, of necessity, be elastic, inasmuch as it must be made to suit conditions on any kind of a piece of work that is done by the firm using it. The author has always found it advisable to have written on the sheet what work was performed and then have items posted in proper cost columns in the office by some one who knows the work and estimate, rather than have cost reported in symbols by men on the job.

Fig. 1 shows a daily time sheet covering the many points. It is used by a general contractor who does excavation, mason work, carpenter work and sometimes plaster work with his own men. It can be used by the balance of the trades as well. A careful study of the sheet will show how it is made out.

The man whose duty it is to take care of this sheet, enters it so that the bookkeeper can later post it with other weekly sheets in weekly cost sheet.

Attention is called to the fact that work done and the cost of same have no relation to each other in these forms. Amounts are simply used to illustrate method of procedure only. In course of work of building a house, for example, all the items of work given are not done at once. The various items shown are simply to show how work is to be reported when that branch of the work comes up.

(Continued on page 57)



C. M. CRUIKSHANK
BUILDING CONSTRUCTION
103 PARK AVE., N. Y. C.

Sheet No. 24

DAILY TIME SHEET

Date January 16 - 1919.

NO.	KIND OF WORK	HOW MUCH	COST (DO NOT WRITE HERE)		AMOUNT REGULAR	AMOUNT EXTRA
1	Foreman.		Foreman. 8	1	12 -	
2	excavating trenches	4 cu yards	excav. trench 16	2	8 80	
3	concrete footings	1 cu yd - 4 bag cement 1/2 yd sand 3/4 yd. stone	conc. foot 8	3	4 40	
4	concrete footings order No. 2	" " " "	extra order(2) 16	4		8 80
5	forms walls.	400' 7/8" x 8"	forms wall 8	5	6 -	
6	brick chimney	500 brick 3 bag cement 9 cu ft sand.	brick chimney 16	6	10 80	
7	rough fl boards 1st fl.	400' 7/8" x 8"	Sheath fl. 8	7	6 -	
8	shingles	1200.	shingle roof 8	8	6 -	
9	hang doors.	6.	trim doors 8	9	6 -	
10	framing 1st tier	500' 2 x 10.	frame first 16	10	10 40	
11			112	11		
12				12		
13				13		
14				14		
15				15		
			DAY TOTAL	79 20	70 40	8 80
			PREV TOTAL	581 60	481 60	100 -
			TOTAL	660 80	552 00	108 80

NAME	HRS	RATE	AMOUNT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	REMARKS
Jones	8	1.50	12 -	8															
Sammis	8	.80	6 40						8										
Green	8	.75	6 -					8											
Wright	8	"	6 -							8									
Conway	8	"	6 -								8								
O'Dow	8	"	6 -									8							
Mitchell	8	"	6 -										8						
Swan	8	.55	4 40		8														
Richards	8	"	4 40		8														
Donlon	8	"	4 40						8										
Peters	8	"	4 40			8													
Grant	8	"	4 40				8												
White	8	"	4 40				8												
Sloane	8	"	4 40										8						
	112																		
			79 20																

The "kind of work" and "how much" is entered on the sheet by the man on the job. He also enters the names of the men and distribution of their time. The bookkeeper does the rest

What the Editor Thinks

Why Some Houses Do Not Sell

MANY have thought that any kind of a house can be sold today and for any kind of a price. Houses are needed badly—there are few to be had. People will, therefore, buy whatever they can get regardless of cost.

But this reasoning is false, as many speculative builders have found out after considerable beneficial experience and in some cases actual loss to themselves.

The public wants houses badly—Yes! But do not fail to consider that the public looks upon house-buying in much the same way as it does upon any other business proposition. The considerations involved are based upon simple business principles. Of course, one may be willing to make some sacrifices to necessity in the purchase of a home, but even this consideration has its limits. After the matters of conveniences, suitability, environment, etc., are disposed of, the first thought is, "will the house pay its expenses?"

Take the case of one-family six-room houses in New York City, priced at $15,000. These houses were brick and well located. They were desirable in every respect. But they proved hard to sell. Why? Figure it out:

On such houses the purchaser must pay his $15,000 cash, or part cash and the balance on mortgage. In either event there is represented an investment of $15,000 which should pay a return of 6 per cent. in order to be rated as sound business. Six per cent. of $15,000 is $900 and that is the first annual charge to be made against the house.

The next is taxes. To make due allowance for possible shrinkage in valuation, assume the assessed value of the house will be $12,000. Calculating taxes at 1921 levels for New York ($2.81 per 100) the tax item or second charge against the house would be $337.20 a year.

But there are other charges to be made, and these include repairs, which we will figure at a fair average of $200, coal which at present costs is at least $150, insurance at $25 a year.

And then there is amortization. The life of a modern one-family house is estimated at 20 years. This does not mean that after 20 years the house cannot be used. It means that after twenty years it will have seen its best days and have become so old-fashiond or worn out that it will be more economical to build a new house than try to live in the old one. In other words, the house may be said to lose $750 of its original value every year. This also must be charged against it, in order to pay for itself in twenty years time.

To be a good business proposition, therefore, this house must earn the following items yearly:

Interest on $15,000 at 6 per cent	$900.00
Taxes on valuation of $12,000 at $2.81 per $100	337.20
Insurance	25.00
Coal	150.00
Repairs	200.00
Amortization	750.00
	$2,362.20

or a total of nearly $2,400 a year. The only earning power of such a house is its rental. It must, therefore, rent for $200 a month or nearly $33 a room per month—unfurnished!

The moral is: If you want your houses to sell readily, keep the price within the limits of a good business investment for the buyer.

Building Up the Farms

HAYSEEDS" are dead. "Rubes" have disappeared. The farmer today is alive, aggressive, alert. He practices farming as a business, and no city dweller is shrewder in its ways.

With better transportation facilities and the extended use of the telephone, the farmer is no longer isolated from his fellow men. He is in ready communication with them. His visits to the city are all in the day's work and not the occasional Fair Day or Market Day once filled with novelty. The moving picture, too, brings the world to his door. His wife and his children feel what they are pleased to consider the "lure" of the city, and yearn to share in its comforts and pleasures.

All these things have served to make the farmer one of the most valued of clients for the builder. He is receptive of suggestions. He will consider improving his buildings; he has already in many cases substituted well-known labor-saving implements for much of his hard agricultural and farm work, at considerable profit of time and money.

The farmer is glad to do for his family what he quite naturally does for his farm beasts, and it is only up to the builder to present two sides of a picture to the prosperous farmer to get in many cases a favorable reaction. Farming is practiced in every state of the Union. No pursuit is more vital to the well-being of the country. There is no argument that can be brought to bear that can lessen the dignity and importance of the practice of farming.

Conditions which endanger the farmer's standard of living endanger also the life of his crops and his cattle and through them the vitality of the country at large. It is therefore a real need that the farms should be modernized and made livable and wholesome, that those who labor thereon shall be contented and given the consideration and care that they so thoroughly deserve.

This is a real chance for the builder.

Winter Unemployment in the Building Industry

THE building industry has been one that has been more or less accustomed to plenty of work for seven months and plenty of rest during the remaining five months of the year.

Employment in any industry must be nearly continuous if it would attract men of the highest calibre and experience. Otherwise, they naturally select a steadier occupation.

Some work should be scheduled for the dull months. Jobs like interior alterations, slight additions to buildings, etc., could be deferred to the off-season, perhaps, by a little persuasion upon the owner. The wrecking operations, preceding other construction work, could be done in the winter and thus gain time in starting the new work. Interior painting and decorating is another cold weather job.

If builders will endeavor to schedule their work to include a lot of cold weather jobs, so as to insure continuous employment for their men, they will do a lot toward building up the calibre and morale of their organization.

Review of Building Situation

BUILDING activity for the month of April was greater than for any preceding April except April, 1920, which was the crest of the 1920 building boom, according to figures compiled by the F. W. Dodge Company, and greater than for any month since June of last year.

These figures show that during the past four months the building revival has gained considerable momentum. At the end of January the activity from the first of the year to date was 6 per cent. behind the average for the preceding five years; at the end of February it was 11 per cent. behind; at the end of March, 4 per cent. behind; at the end of April, 5 per cent. ahead of the average for the first four months of each of the preceding five years. Up to the time of going to press May bids fair to equal April.

Residential building led all other classes in April. The demand for new construction is holding strong; in fact, it is so insistent that increasing activity will likely prevail during the coming months.

The threatening element in the building situation is the attitude of labor. Wage disputes are reported in many centers, but in view of the lack of activity in other industries and the general slackness of the employment situation throughout the country, this situation is not looked upon as seriously as it would have been a year ago and it is expected that possible labor troubles will not retard construction materially, if it does temporarily here and there.

CONTRACTS AWARDED.

	CLASS OF BUILDING						
Section of Country	Residential	Industrial	Business	Public Works and Utilities	Educational	Other	Total
New England	$6,941,100	$1,722,700	$3,859,000	$1,707,700	$1,194,200	$2,403,200	$17,827,900
New York Dist.......	28,146,200	2,352,100	6,861,300	4,901,700	1,793,400	6,971,900	51,026,600
Middle Atlantic	9,944,500	2,069,000	2,243,700	7,460,800	1,518,800	4,009,200	27,246,000
Pittsburgh Dist.	11,036,200	1,696,500	4,308,800	12,130,400	5,561,600	7,286,200	42,019,700
Middle West	17,266,000	4,839,500	11,471,100	19,474,400	10,821,400	11,223,600	75,096,000
Northwest	1,681,500	189,500	432,500	2,368,000	1,751,000	1,247,600	7,670,100
Total	75,015,500	12,919,300	29,176,400	48,043,000	22,640,400	33,141,700	220,886,300

CONTEMPLATED PROJECTS.

	CLASS OF BUILDING						
Section of Country	Residential	Industrial	Business	Public Works and Utilities	Educational	Other	Total
New England	$7,666,400	$2,215,200	$4,484,500	$19,064,400	$3,993,000	$4,667,800	$42,091,300
New York Dist.......	49,921,100	4,315,200	13,435,800	10,762,800	3,321,500	10,235,100	91,991,500
Middle Atlantic	16,865,900	14,855,000	5,657,700	9,406,900	2,515,000	6,657,000	55,957,500
Pittsburgh Dist.	20,095,800	5,151,500	10,397,800	9,699,600	2,761,000	6,988,800	55,094,500
Middle West	31,749,800	10,200,600	10,948,900	45,716,600	7,688,300	15,133,200	121,437,400
Northwest	4,685,600	679,500	2,528,000	7,985,000	1,059,600	1,762,400	18,700,100
Total	130,984,600	37,417,000	47,452,700	102,635,000	21,338,400	45,444,300	392,272,300

Building Material Prices

Note—Applying to all quotations. Price advances over last month indicated by (+), declines by (—).

Common Brick

The following are prices per M delivered on the job:

†New York	—$19.50
Boston	—22.00
Pittsburgh	18.00
Detroit	18.00
§Cleveland	17.00
Chicago	12.00
St. Louis	18.00
Kansas City	—12.00
*Denver	14.00
Seattle	16.50
San Francisco	16.50
‡Dallas	15.00
New Orleans	—15.00
‡Atlanta, Ga.	15.00
Philadelphia	20.00
St. Paul	—19.00
Indianapolis	—18.00

---

*Stiff mud common hards are $18.50.

†Truck load lots.

‡F. O. B. city named.

§Run of kiln.

Portland Cement

The following are the prices per bbl. in carload lots to contractors (not including the package):

†New York	$2.90 to 3.10
²New York	2.40
Boston	2.86
Pittsburgh	2.17
Cleveland	2.43
Detroit	2.43
Indianapolis	2.43
Chicago	2.17
New Orleans	—3.12
St. Louis	2.60
St. Paul	2.41
‡Kansas City	2.85
Denver	2.90
Seattle	3.10
¹San Francisco	3.00
*Atlanta, Ga.	4.00

Note: Add 40c. to current prices to obtain price, including cloth bags (4 bags to a barrel) — refund of 10 cents each for bags returned. Add 15 cents per barrel for paper bags.

Bulk prices 5 cents less per barrel than current prices shown above.

---

*Includes sacks.

†Truck loads at site N. Y. C.

‡F. O. B. Kansas City.

¹Package 15c. on and off.

²Alongside dock.

Sand and Gravel

Based on cu. yd. or per ton as indicated.

The following are the prices per cubic yard in carload lots, F. O. B. cars at shipping point for ctiy indicated:

	Sand.	¾ in. Gravel.	1½ in. Gravel.
New York	—$2.25	—$3.70	—$3.70
Detroit	2.50	2.50	2.50
Chicago	— 2.25	— 2.25	— 2.25
St. Paul	1.00	2.15	1.85
Denver	1.60	2.00	2.00
Seattle	1.50	1.50	1.50
Dallas	1.75	2.50	3.00
New Orleans	— .50	— 1.60	— 1.60
Grand Rapids	.75	.75 to .80	1.50

The following are the prices per ton in carload lots, F. O. B. cars at shipping point for city indicated:

Boston	$1.50	$2.75	$2.50
Cleveland	1.70	....	....
Pittsburgh	1.30	1.30	.85
*Indianapolis	.60	1.50	.75a
St. Louis	1.60	1.60	1.55
*Kansas City†	.75	2.00	2.00
San Francisco	1.60	1.45	1.45
Milwaukee	1.32	1.42	1.42
Atlanta, Ga.	1.625	1.625	2.875

---

*Prices per ton F. O. B. plant.

†Kaw River sand is $1.90 per yard at retail yards.

aScreened gravel.

b F. O. B. Cleveland.

Crushed Stone.

The following are the prices per cubic yard in carload lots:

	¾-in. Stone.	1½-in. Stone.
New York	—$3.50	—$3.30
Chicago	—2.25	—2.10
St. Paul	2.15	1.85
Grand Rapids	1.50	....
Denver	2.00	2.00
Dallas	2.70	2.70
*San Francisco	—2.50	—2.75
Kansas City	2.35	2.35

These prices are per ton in carload lots:

Cleveland	$2.50	$2.75
Detroit	2.77	2.77
Milwaukee	1.72	1.72
†Indianapolis	1.35	1.25
Pittsburgh	3.50	3.50
Boston	2.65	2.60
St. Louis	2.60	2.60
Atlanta, Ga.	3.00	2.75

---

*F. O. B. trucks at bunkers.

†F. O. B. quarry.

Above Prices from American Contractor

Structural Material

(From the Iron Trade Review.)

The following are the base prices, per 100 pounds, f. o. b. mill, Pittsburgh:

	Mill Pittsburgh
Beams, 3 to 15 in.	$2.20
Channels, 3 to 15 in.	2.20
Angles, 3 to 6 in., ¼ in. thick	2.20
Tees, 3 in. and larger	2.20
Plates	2.20
Bars	2.10
Structural rivets	—3.50 to 3.70
Galvanized corrugated sheets	5.05
Hoops	2.75
Plain wire	3.00
Wire nails	3.25

Freight rates per 100 lbs. on carload lots from Pittsburgh to important centers of the country:

New York	$0.38
Philadelphia	0.35
Boston	0.415
Buffalo	0.295
Cincinnati	0.33
Indianapolis	0.345
Chicago	0.38
St. Louis	0.475
Kansas City (minimum carload 46,000 lbs.)	0.815
St. Paul (minimum carload 46,000 lbs.)	0.695
Denver (minimum carload 46,000 lbs.)	1.35
Omaha (minimum carload 46.000 lbs.)	0.315
New Orleans	0.515
Birmingham	0.765
Pacific Coast (minimum carload 50,000 lbs.)	1.665

Note—A 3 per cent. transportation tax applies.

Following Prices Are F.O.B. Mill

Face Brick	Per M
Hawards	$47.00
Tapestry	32.50
Caledonian	27.00
Buffs or grays	34.00
Smooth in gray	35.00

	Per M
Fisk lock	$30.00 to $37.50
Selected	28.50
Kiln run	27.50
Garden walls	23.50

Hollow Tile	Per lin ft.
4x12x12	$ .20
6x12x12	.28
8x12x12	.40

Lime	Per ton
Finishing hydrate	$26.00
Mason's hydrate	22.00

Delivered New York City.

Metal Lath	Per sq. yd.
2.3″	$ .25
3.0″	.27
3.4″	.29

For galvanized add 5 cents.

Shingle Stain	Per gal.
Red or brown	$2.75

By bbl. deduct 15c. per gal.

New York City prices.

Shingles.

Asphalt	Per sq.
Single	$9.00
Strip	8.20

Stained Shingles (Per Square)

	Brown and Red	Green	Gray and White
16″ extra clear	$9.65	$9.90	$10.45
18″ Eureka	11.25	11.50	12.05
18″ Perfection	12.40	12.65	13.20
24″ Royal	27.95	28.50	29.90
24″ Imperial	29.70	30.25	31.65

Wall Board

Per M. sq. ft.	$35.00

Window Glass

Single thickness—A and B Quality	82%
Double thickness—A Quality	83%
Double thickness—B Quality	85%

Douglas Fir

From American Cotnractor

All prices MFBM, F. O. B. mill.

FLOORING. Lengths 10 ft. to 20 ft.

Size in Inches	No. 2 and Better Ver. Grain.	No. 2 and Better Flat Grain.	No. 3 Clear Ver. Grain.	No. 3 Clear Flat Grain.
1x3	$58.50	$40.50	$43.00	$35.50
1x4	+52.00	23.00	—23.00	18.00
1x*	+57.50	26.00	35.00	—22.00
1x¼x4*	58.50	—30.00	35.50	30.00

Note—For lengths from 6 ft. to 9 ft. deduct $1.

*No reduction in these prices for short lengths.

CEILING. Lengths 10 ft. to 20 ft.

Size in inches.	No. 2and Better.	No. 3 Clear.
¼x4	$21.50	$15.50
⅝x4	22.00	16.50
¾x4	23.00	20.00

Note—Fof 15% short lengths from 6 to 9 ft., deduct $3.

DROP SIDING.

Size in inches.	No. 2and Better.	No. 3 Clear.
1x6—No. 106	$25.00	$18.50

DIMENSION LUMBER.

	No. 1 Common Dimension—S1S1E				
Size in inches.	8′-12′-14′	16′	9′-10′-18′-20′	22′-24′	26′-32′
2x4	—$11.50	—$12.50	—$13.50	—$14.50	—$16.50
2x6	— 11.00	—12.00	—12.50	—13.50	—15.00
2x8	— 11.00	—12.00	—12.50	—13.50	—15.00
2x10	—12.00	—12.50	—13.00	—14.00	—16.00
2x12	—12.50	—13.00	—13.50	—14.50	—16.50
2x14	—14.00	—14.00	—15.00	—16.00	—18.00
2x16	—15.00	—15.00	—16.00	—17.00	—18.00

Note—Common dimensions may be specified lengths without additional charge.

Freight Rates.

Per MFBM in carload lots from mill to principal markets.

FLOORING:

Seattle	$ 1.50	St. Louis	$16.00
San Francisco	8.00	Cincinnati	19.00
St. Paul	13.50	Dallas	21.25
Denver	12.00	Boston	21.25
Kansas City	14.75	New York	21.25
Chicago	16.00		

CEILING:	½x4.	⅝x4.	1x4.
Seattle	$ 0.75	$ 1.00	$ 1.50
San Francisco	4.75	5.60	8.00
Denver	7.25	8.50	12.00
St. Paul	8.00	9.25	13.50
Kansas City	8.75	10.25	14.75
Chicago	9.50	11.25	16.00
St. Louis	9.50	11.25	16.00
Cincinnati	11.25	13.25	19.00
Dallas	12.75	15.00	21.25
Boston	12.75	15.00	21.25
New York	12.75	15.00	21.25

DROP SIDING—BOARDS AND SHIPLAP.	Drop siding.	Boards, shiplap.
Seattle	$ 1.50	$ 1.75
San Francisco	8.00	10.00
Denver	12.00	14.25
St. Paul	13.50	16.50
Kansas City	14.75	18.50
Chicago	16.00	20.00
St. Louis	16.00	20.00
Cincinnati	19.00	23.50
Dallas	21.25	26.50
Boston	21.25	26.50
New York	21.25	26.50

FINISH AND DIMENSION:

	1″ Fin.	1¼, 1½ & 2″ Fin.	2x4-6-8″ Com.	2x10-12 Com.	2x14x16″ Com.
Seattle	$ 1.75	$ 2.00	$ 1.75	$ 2.00	$ 2.00
San Francisco	10.00	10.75	10.25	10.75	11.25
Denver	14.25	16.25	15.50	16.25	16.50
St. Paul	16.50	18.00	17.50	18.00	18.50
Kansas City	18.50	20.00	19.50	20.00	20.50
Chicago	20.00	21.50	21.00	21.50	22.50
St. Louis	20.00	21.50	21.00	21.50	22.50
Cincinnati	23.50	25.50	25.00	25.50	26.25
Dallas	26.50	28.75	28.25	28.75	29.75
Boston	26.50	28.75	28.25	28.75	29.75
New York	26.50	28.75	28.25	28.75	29.75

Southern Pine.

(*From American Contractor.*)

All prices per MFBM, f. o. b. mill.

FLOORING. Lengths 8 ft to 20 ft.

	Size in inches		
Grade.	1x3	1x4	1x6
B. and Btr. fl. gr	$34.25	$34.25	$41.50
No. 1 Com	28.25	28.25	26.75
No. 2 Com	16.25	19.25	14.50
No. 3 Com	....	....	9.50
B. and Btr. Edge	—62.00	55.25	....

CEILING. Lengths 8 ft. to 20 ft.

	Size in inches		
Grade.	½x4.	⅝x4.	¾x4 Part'n.
B. and Btr	$32.00	$32.00	$38.00
No. 1 Com	28.00	26.50	31.00
No. 2 Com	14.25	15.50	19.00

DROP SIDING. Lengths 8 ft. to 20 ft.

Grade.	Nos. 104, 106, 117.	No. 116.	Other patterns.
B. and Btr	$34.25	$41.50	$35.25
No. 1 Com	28.00	....	28.00
No. 2 Com	17.00	....	17.00

Any of the above ordered in special lengths, add $1.

LATH, No. 1 KD., $3.

FINISH.

Size. in Inches.	B. and Btr. S2S. Mixed cars.	Rough. B. and Btr. Straight cars.
1x4	$40.00	$39.00
1x5 and 1x10	47.00	46.00
1x6	40.00	39.00
1x8	40.00	39.00
1x12	47.00	46.00
5/4 and 6/4x4, 6 and 8	53.50	52.50
5/4 and 6/4x10 and 12	60.00	59.00
2x4, 6 and 8	58.00	57.00
2x10 and 12	60.00	59.00

For specified lengths, add $1 to above prices.

For straight cars, deduct $0.50 from above prices.

For S4S, add $0.50 to S2S price.

For C finish, deduct $5 from B and Btr.

DIMENSION LUMBER. No. 1 Com.—S1S1E Std.

	Length in Feet		
Size. in Inches.	12-14.	10-16-18-20.	22-24.
2x4	$22.00	$24.50	$26.50
2x6	20.50	22.50	24.50
2x8	21.00	23.50	25.50
2x10	23.00	25.00	29.50
2x12	25.00	27.00	29.00

Rough lumber, $0.50 less than above prices.

No. 2 Com., $5 less than above prices.

S2S & C. M., D. & M. or Shiplap, 50 cents more than above prices.

BOARDS. Lengths 8 ft. to 20 ft.

	1x2.	1x3.	1x4.	1x6.
No. 1 Com	$25.00	$27.50	$25.50	$26.50
No. 2 Com	14.00	16.50	13.00	15.50
No. 3 Com	10.00	10.50	9.00	9.50

	1x8	1x10.	1x12.
No. 1 Com	$26.00	$27.00	$35.00
No. 2 Com	18.00	18.00	20.00
No. 3 Com	10.00	10.00	10.00

For specified lengths, add $0.50 to above prices.

For kiln dried, add $1 to above prices.

For shiplap or D. & M. S2S and C. M., add $0.50 to above prices.

Freight.

Per MFBM in carload lots from mill to principal markets.

FLOORING.	1x3 Flg.	1x4 Flg.	1x6 Flg. ¾ in.
St. Louis	$6.50	$7.25	$7.75
Chicago	8.75	9.75	10.50
Cincinnati	8.00	9.00	9.75
St. Paul	10.00	11.00	12.00
New York	11.00	12.00	13.00
Denver	11.25	12.50	13.50
Boston	12.00	13.25	14.50

CEILING.	½x4 Clg.	⅝x4 Clg.	¾x4. (Partition).
St. Louis	$4.00	$5.00	$5.75
Chicago	5.25	6.50	8.25
Cincinnati	5.00	6.00	7.25
St. Paul	6.00	7.50	9.00
New York	6.50	8.25	9.75
Denver	6.75	8.50	10.25
Boston	7.25	9.00	10.75

DROP SIDING.	1x6 D. Sdg. (not 116).	1x6 D. Sdg. No. 116.
St. Louis	$6.25	$6.75
Chicago	8.25	9.25
Cincinnati	7.50	8.50
St. Paul	9.50	10.50
New York	10.25	11.50
Denver	10.75	12.00
Boston	11.50	12.50

BOARDS.	1x4 to 1x10 S2S ¾″.	1x4 to 1x10 S2S 13/16″.	1x12 S2S 13/16″.
St. Louis	$8.75	$8.75	$8.00
Chicago	11.00	12.00	12.25
Cincinnati	11.00	11.00	11.25
St. Paul	13.50	13.50	14.00
New York	14.75	14.75	15.25
Denver	15.25	15.25	15.75
Boston	16.25	16.25	16.75

FINISH.	1″ S2S	5/4 & Thicker S2S.	Rough.
St. Louis	$8.50	$8.50	$11.00
Chicago	11.50	12.25	15.00
Cincinnati	10.50	10.50	13.75
St. Paul	13.00	13.00	17.00
New York	14.25	14.25	18.50
Denver	14.75	14.75	19.50
Boston	15.50	15.50	20.50

DIMENSION.	S1S1 Std. (2x4, 2x6, 2x8).	S1S1 Std. (2x10, 2x12).	Rough.
St. Louis	$8.75	$8.00	$11.00
Chicago	12.00	12.25	15.00
Cincinnati	11.00	11.25	13.75
St. Paul	13.50	14.00	17.00
New York	14.75	15.25	18.50
Denver	15.25	15.75	19.25
Boston	16.25	16.75	20.50

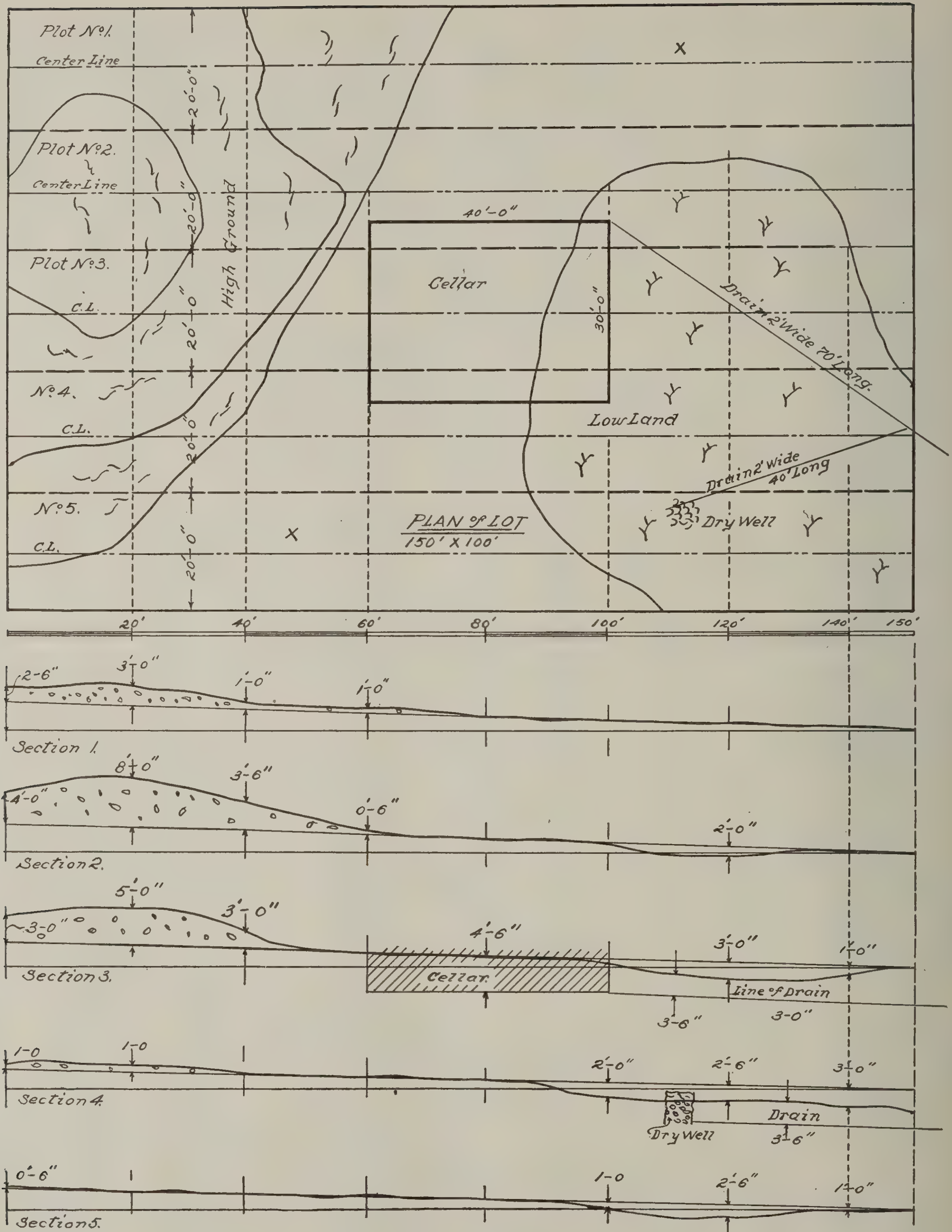


Fig. 1.

ESTIMATING EXCAVATING AND GRADING. SEE PAGE 55

The upper sketch is a plan view of the plot to be graded, and the lower sketches are sections taken at various points in the lot

Method of Estimating Excavation and Finished Grading

By LAWRENCE S. KEIR

An estimate on the excavating and grading required for a lot 100x150 ft., as shown by the plan and cross sections in Fig. 1 will be considered. The labor items given in the estimate are a fair average for the writer's own territory, but of course are not accurate under all conditions of labor, climate, and soil. The method of estimating, however, will be the same anywhere, and each reader can adjust the details to his own section of the country.

The profile of each plot on the plan is shown by a cross section taken through the center line of each. If the lot itself is laid out in plots to correspond to those shown on the plan, the work can be gauged fairly accurately. This may save considerable work in the end, as the places where the sod has not been disturbed form convenient gages for the rough work.

Referring to the plan and sections, we find that the area of ground to be stripped of top soil is approximately as follows:

Plot No. 1—a strip	20 ft. wide	x 70 ft. long—	1,400 sq. ft.
" " 2— "	20 "	x 70 "	1,200 "
" " 2— "	15 "	x 40 "	600 "
" " 3— "	20 "	x 50 "	1,000 "
" " 3— "	20 "	x 55 "	1,100 "
" " 4— "	20 "	x 35 "	700 "
" " 4— "	20 "	x 65 "	1,300 "
" " 5— "	10 "	x 20 "	200 "
" " 5— "	20 "	x 50 "	1,200 "
That portion of cellar site not already figured in with the low land, about 30x30 ft........			900 sq. ft.
Total area			9,600 sq. ft.

Ninety-six hundred sq. ft. of soil 8″ thick represents 236½ cu. yd. of soil. Three men and a team of horses should strip off 340 sq. yd. 8″ thick, or 75 cu. yd. per day. It will take, then about 3 1/7 days to strip 236 cu. yd.

Next in order are the drains. Considering the profiles showing the sections through which the drains pass, an average depth of 3′ 9″ should give a fair approximation. We have, then, 110 lin. ft. of drain, 2 ft. wide. Since 8 in. of top soil has already been removed, we will call the drain 3 ft. deep—

110×2×3=660 cu. ft. or 24½ cu. yd.

Two men working can pick and throw out 15 cu. yd. per day therefore, 24½ cu. yd. will take them about 1 2/3 days.

110 lin. ft. of 8 in. drain tile at 35c per ft. costs $38.50. The labor of setting the tile is one man for 2 hours. Then there is one loadstone for the dry well at end of short drain, costing $2.00, and the back filling of 110 lin. ft. of drain at 1/3 cost of digging.

Having dug the drains, placed the tile in them and filled them up again, we are ready to dig the cellar. The easiest way to go at it will be to plow and scrape as far as possible and when the ground becomes too hard to plow, blasting and scraping can be done. The loose earth can easily and handily be dragged out to the low land and dumped there. The cellar must be dug 1 ft. larger all around than shown on the plan—

32′×42′×3′–10″=5,152 cu. ft. or 184 cu. yd. of cellar excavating* Three men with a team of horses should remove 60 cu. yd. per day. 184 cu. yd. will take them about three days.

More material than that excavated from the cellar will be needed to fill the low ground and it will not be possible to figure on the rest of the fill until the amount of fill still needed is known. The low ground will be 8″ deeper than represented on the section after the top soil has been removed, but as the top soil is to be replaced again we will come very near the right figure if we take the dimensions as shown on the section plans.

As shown on the plan and sections, total fill required is:

Plot No. 2—15 ft. wide	—20 ft. long	—2 ft. deep	= 600	cu. ft.
" " 3—20 "	—55 "	—2′ 6″ "	=2,750	"
" " 4—20 "	—65 "	—2′ 6″ "	=3,250	"
" " 5—20 "	—60 "	—2′ 6″ "	=2.100	"
Total			8,700	cu. ft.
			(or 322 cu. yd.)	

There were 184 cu. yd. of earth removed from the cellar.

322–184=138 cu. yd. of earth still needed to fill the low ground.

This material will be taken from the high ground at the back of the property, using the same method as used in excavating the cellar. While the haul is a little longer the work is more accessible; so the number of yards moved per day should be about the same as on the cellar excavating. At this rate, 138 cu. yd. @ 60 cu. yd. per day will require the team and three men about 2 1/3 days.

The high ground must be removed to 8 in. below

---

*Cellar is shown 4 ft. 6 in. deep, but 8 in. has already been removed.

(*Continued on page* 58)

Suggestions for Financing Homes

Mr. Daniel Crawford, Jr., president of the Philadelphia Operative Builders Association, makes some good suggestions to improve the financing of home building in Philadelphia. Has your town a better scheme, Mr. Builder? If so, others would like to know what it is. Tell us about it.

SPEAKING before the Philadelphia Conference of the Construction Industries, Mr. Daniel Crawford, Jr., president of the Philadelphia Operative Builders' Association, briefly outlined the plan used extensively in Philadelphia for financing the purchase of a home, as follows:

$10,000 HOUSE

First mortgage, $5,000 @ 6 per cent		$300.00
2d mortgage, $3,000; 15 shares in B. & L. Ass'n.		

MONTHLY BUILDING AND LOAN PAYMENTS

Dues on shares	$15.00	
Interest	15.00	
Premium on loan, 25c share	3.75	
	$33.75×12	$405.00
City tax, $8,000 @ $3.00 hd.		240.00
Water rent		12.00
		$957.00
Monthly		$79.75

Pays off second mortgage only, in not more than twelve years.

The weakness of the present plan, Mr. Crawford says, lies in the fact that the greatest lien, the first mortgage, is very seldom paid off. On the average home that we sell today, we place a first mortgage for from three to five years thereon, and a second mortgage in a building and loan association. The carrying charges, if you will notice, including all of the underlying charges of the house, taking a ten thousand dollar house as a basis, are $79.75 or, about 1 per cent. of the principal of the indebtedness. Just about 1 per cent. of the principal of the indebtedness is the amount that the average home buyer is willing to tie himself up to as a monthly payment. Our experience has been that those second mortgages are paid off long before the building and loan stock becomes due upon which the loan is made, and I believe I am safe in saying that the average second mortgage is paid off in eight years rather than twelve, when the stock matures, indicating that the man when he buys his house and obligates himself to pay a certain charge takes on a responsibility, and then goes to work to wipe it out. He pays extra payments on that mortgage, and before long, a period of a few years rolls around, and he owns the house subjejcjt to the first mortgage. There is the evil of the system he never touches the first mortgage. It stands there as a permanent lien on his home. I would like to see that system wiped out entirely and a new system adopted by some institution that will loan that man 80 per cent. For example the new plan could be as follows:

$6,000 HOUSE

Mortgage	$5,000	@ 6 per cent	$300.00
City Tax	5,000	@ $3.00 Hundred	150.00
Water rent			8.00
			$458.00
Annual payment 3 per cent			150.00
			$608.00
Monthly			$50.67

$8,000 HOUSE

Mortgage	$6,500	@ 6 per cent	$390.00
City Tax	6,500	@ $3.00 Hundred	195.00
Water rent			8.00
			$593.00
Annual payment 3 per cent			195.00
			$788.00
Monthly			$65.67

$10,000 HOUSE

Mortgage	$8,000	@ 6 per cent	$480.00
City Tax	8,000	@ $3.00 Hundred	240.00
Water rent			12.00
			$732.00
Annual payment 3 per cent			240.00
			$972.00
Monthly			$81.00

The first mortgage in this case would be eight thousand dollars. The annual payment instead of being 6 per cent., as it is today on the second mortgage, would be only 3 per cent. on the entire indebtedness, paying off $240, where, on the other plan, he only pays off $180 on the principal, and that plan, will amortize his entire loan in about nineteen years. I make the prediction, that if we could adopt a plan of that kind, the average home buyer would own his home in twelve years, and not in nineteen, and there are institutions within our midst that ought to adopt that plan.

Window Seats

A WELL considered window seat has an appeal all its own. In the small house where there is little space for chairs, and in the larger one where bare corners and uninteresting spots are not infrequent, there is good opportunity for this pleasant feature.

A window seat may serve both a utilitarian and a decorative purpose. In the former case the lower portion may be used as a chest or closet to conceal various things according to the room in which it is placed: magazines or papers in the living room; toys in the nursery; shoes in the bedroom; and so on throughout the house.

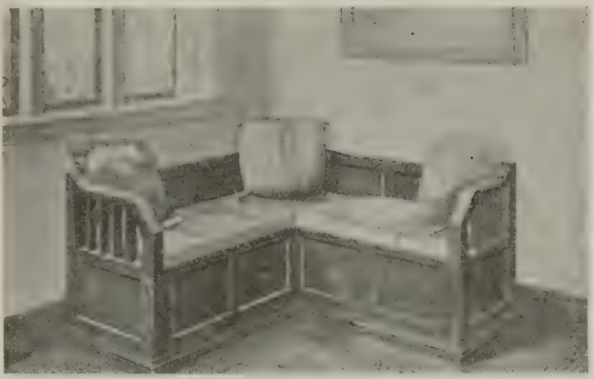
It is quite usual to construct a window seat over a low radiator. In this case the wood seat must be lined with tin and asbestos to protect it and also to throw the heat into the room, the tin having a curved back and thus acting as a heat reflector.

A window seat may be built only parallel with the window or it may be carried into nooks and corners, affording secluded places where groups of persons may get off by themselves.

A bay window offers a particularly delightful opportunity for the window seat. Here it may fit into space not otherwise required and will give an air of completeness and coziness that everyone who sees it may enjoy.

It is possible to upholster a window seat in cretonne or other material in harmony with the rest of the room, or to add a few cushions to effect this purpose. There is no especial need to do this, however, except as a matter of personal preference, because window seats may be had in stock designs with excellent wood finish as illustrated herewith.

A bay window seat with drawers for storage, etc.



An upholstered corner seat near the windows

A window seat should be large and comfortable. The essence of its success lies in the informality which it makes possible. It is preferable for its base to rest fully upon the floor for ease in cleaning. If it is raised but a couple of inches high, sweeping is awkward and encourages neglect. If the window seat does not so touch the floor, it should be several inches high so that one may readily reach under it. It must be remembered that it cannot be picked up and moved like the usual chair, and any cleaning that is necessary must be done while it is in its customary place.

Of course one wants to be able to look out of the window from a window seat. But the window seat should not be built so high that the average person cannot touch the floor with his feet when he occupies the window seat. It is therefore desirable to plan in advance which window is to have a window seat and when possible, construct that window sufficiently low to serve this purpose.

Daily Time Sheet

(Continued from page 49)

This sheet should always be made in duplicate, copy being kept on the job as a record for man making sheet. This is a matter of protection for him and a check to see that there is no tampering with the sheet in the office.

In the column headed "amount extra" are put all the items of additional or extra work. At the end of the job it is a simple matter to get this labor total as it is totalled daily as work progresses.

The author has found it more satisfactory to have nothing on this sheet but labor. Have a daily report come in with all the information wanted from the work. This simplifies work in the office, as different men are interested in different parts of the work and so can have the sheet they want. If information of all kinds is on the time sheet this leads to confusion.

It is quite likely that a little labor and a few sliding doors may make other dilapidated barns into rent-producing garages, as was done here

Old Barn Made Into Eleven Stall Garage

By Dale R. Van Horn

THE rejuvenated barn shown here was dismantled and all of the dimension stuff and most of the sheathing was found to be in good condition. The usable lumber was sorted and piled and the kindling carted away at stove wood prices.

Soon after workmen appeared on the scene and put up the frame for an eleven-stall garage. The dimension stuff worked nicely for posts and headers and sills and plates. The foundation was of concrete, provided with the usual size of bolts with which the sills were later bolted down. Metal lath was then placed on the outside of the building and this covered with a medium gray stucco. The roof was covered with tarred building paper.

Some old colored windows which once adorned monotonous stretches of siding on the barn were saved and put to good use as may be seen by glancing at the cuts. The front of the garage was given a coating of stucco impregnated with white coloring and with the soft pine trim which was painted brown, the effect was all to the good. In fact, all that came in the expense column, beside the item, labor, was the cost of tile for the back and the stucco used, plus, of course, the cost of the doors and hangers.

This garage now nets the owner some fifty dollars a month and the stalls are always in demand to renters. Though built only two years ago, it has more than paid for itself and the income from now on is clear profit.

Perhaps this may suggest to the inventive mind of another builder similarly situated that he can cash in on something that he thought was a "deadbeat."

Estimating Excavation and Grading

(Continued from page 55)

finished grade to allow refilling with 8 in. of top soil. As 8 in. has already been stripped off, the amount to be removed can be taken as though it were the same as already shown on the section drawings.

Plot 1, a strip	20 ft. wide	—70 ft. long	—2 ft. deep†	=2,800 cu. ft.
" 2, "	20 "	60 "	—4 "	=4,800 "
" 3, "	20 "	50 "	—4 "	=4,000 "
" 4, "	20 "	35 "	—1 "	= 700 "
" 5, "	10 "	20 "	—6 in. "	= 100 "
				12,400 cu. ft.

12,400 cu. ft. equal 459 cu. yd. Of this 459 cu. yd. only 138 cu. yd. can be used on the premises. 459–138=321 cu. yd. of earth to be removed from the premises.

A team of horses and two men will pick loose, load and haul for a short distance about 15 cu. yd. per day. Much depends on the length of haul. One cu. yd. is taken as a load. It will take two men and team with wagon about 21¼ days, therefore, to remove the 321 cu. yd.

Replacing top soil will take about the same length of time as in removing it if done with a team and scraper. After this is done, the sod that was not stripped will be plowed up and the whole premises harrowed over, while a man with a shovel fills up the small holes. This will require two men and team one day.

TOTAL COST OF EXCAVATING AND GRADING

Stripping top soil, 236½ cu. yd.:		
Two men 3 1/7 days @ $4.00 per day.....	$25.14	
Man and team 3 1/7 days @ $8.00..........	25.15	$50.28
Digging drain and laying tile, 24½ cu. yd.:		
Two men 1 2/3 days @ $4.00..............	$10.68	
110 lin. ft. of 8 in. drain tile @ 35c........	38.50	
Laying tile, one man 2 hours..............	1.00	
Loadstone for dry well....................	1.00	
Back filling at 1/3 cost of digging.........	3.56	$55.74
Cellar excavating, 184 cu. yd.:		
Two men 3 days @ $4.00..................	$24.00	
Man and team 3 days @ $8.00............	24.00	$48.00
Extra low land filling not taken from cellar 138 cu. yd.:		
Two men 2 1/3 days @ $4.00..............	$21.34	
Man and team 2 1/3 days @ $8.00.........	21.34	$42.68
High ground removed from premises, 321 cu. yd.:		
One man 21¼ days @ $4.00................	$85.00	
Man and team 21¼ days @ $8.00..........	170.00	$255.00
Replacing top soil:		
Allow same price as for removing........		$50.28
Plowing and harrowing:		
One man 1 day @ $4.00.....................	$4.00	
Man and team 1 day @ $8.00..............	8.00	$12.00
Total estimate		$513.98

---

†The depths are taken at a fair average as judged by eye from the sections and dimensions shown.

Suggestions for Wall Treatment

IN the long story of environment, walls play an important part. Whether the room be gloomy or cheerful, masculine or feminine, formal or informal, its essence is well revealed by the walls and these in no small degree directly influence the people who are surrounded by them.

There are certain ways of treating walls to make them produce the happiest results. Just as other structural and decorative features in the house may not be permitted a haphazard birth, so, too, should the walls receive their share of study.

In the small house where rooms are communicating, with wide open doorways between them like many living rooms and dining rooms, it makes both such rooms look larger if walls are treated alike as to paper or paint or other covering as the case may be. A number of different color schemes should not be introduced into the rooms on the same floor, as this cuts them up into independent units. One should plan the combination so that when seen from a chief view-point, such as the main entrance, the impression is one of a harmonious whole.

In living rooms where a restful atmosphere is desired, plain paper or a simple stripe of the same color suggests itself. One advantage of the subdued stripe is the fact that imperfections in the wall are less readily noticed. A hall should also have plain paper if paper is used at all, because patterns tend to make it look smaller.

In choosing wall colors and patterns for the bedroom, the tone of the paper should be light and preferably plain, or at most two-toned and inconspicuously marked. Flower and other designs in regularly spaced bunches should be avoided as should also, the restless and showy patterns. Whenever the curtains or covers in a room are of cretonne or other figured material, it is practically essential to have a plain wall surface.

Where wallboard is used, the narrow panels demand either a one-toned color or a very small and unobtrusive pattern. Wherever any doubts arises, decide on the proper color as suggested above; that is the chief thing; then select a plain, one-toned pattern in that color and you will be perfectly safe. As stated before, the wall today serves as background rather than decoration and the decoration may be supplied by the proper selection and hanging of draperies, pictures, and other accessories that are to be in the room.

The color of the walls must harmonize with the ceiling and with the floor covering. A perfectly white ceiling will have nothing in common with soft yellow walls. A little yellow in the ceiling to make it cream color will bring them into proper relation. Similarly with the floors. These should be the darkest part of the room, as they are the foundation and should give the feeling of solidity that they demand. The walls should be lighter and the ceiling lightest of all. It is so in nature; the dark earth, the lighter foliage with the sun penetrating its upper edges; the brilliant light sky itself.

A cloth wall covering, finished in durable oil colors, that is claimed to be non-absorbent and impervious to grease and water stains can now be obtained. The ease with which it may be cleaned and the fact that it is smooth and non-porous enough to keep out germs are factors in its favor. This material comes in a large variety of decorative designs, reproducing effects of tapestry, leather, grass cloth, etc., at moderate cost, as well as glazed styles for bathrooms and kitchens.

Tile is the acknowledged standard for bathrooms. Its absolute cleanliness and resistance to steam and water have made it so.

Paint, of course, is admirable, and is gaining in popularity for every room in the house as well as kitchen and less conspicuous portions. It is durable, sanitary and economical. A white-leaded wall dries hard, lasts for years and stands frequent washing.

The dignified and restful simplicity of a room whose walls are of one plain color is here revealed. It is left for the chairs and lamp to give the color contrasts, while the wall properly serves as background

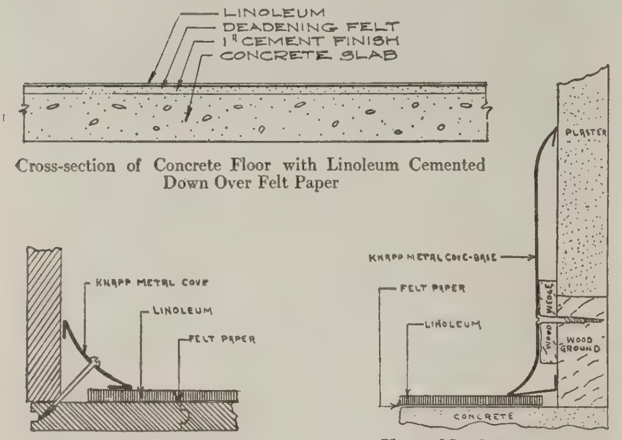
Linoleum Floor Coverings

(*Continued from page* 48)

the linoleum because of bulging or cracking, due to faulty laying, is eliminated.

The advantages of using a layer of felt are many. They include:

1. On wood floors, the work of laying usually can be complete in a single trip. Ordinarily the floor can be used at once—while the work is in progress, if necessary. On concrete floors, the felt is laid one day and the linoleum the next.
2. The felt layer acts as a cushion and makes the floor delightful to walk upon. Its use positively increases the life of the linoleum.
3. The felt layer deadens sound. It makes the floor much warmer in winter.
4. When properly pasted to the felt, the linoleum cannot bulge, expand or contract. Retrimming is unnecessary.
5. All floors—particularly wood—are subject to expansion and contraction, due to heat and cold. The felt takes up this expansion or contraction, and prevents cracking or breaking, which is apt to occur when linoleum is cemented to wood.
6. The linoleum can be removed without damage and with little difficulty, if occasion should arise.



Cross-section of Concrete Floor with Linoleum Cemented Down Over Felt Paper

Knapp Sanitary Metal Cove

Knapp Metal Cove and Base

Details for Laying Linoleum Over Cement or Wood Floors

It is usually best first to cut the felt to fit the short way of the room. It should be measured so the edges will fit flush with the baseboard.

In similar manner, the lengths of linoleum should be cut to fit the long way of the room, or across the lengths of building felt. It is well to cut both the felt and the linoleum a little long and trim to fit.

Whether the felt layer is used or not, all wood floors should be dry and well-seasoned before the linoleum is laid. The surface should be smooth and even, and free from all dirt or foreign matter. All cracks should be filled, and if knots or nails protrude they must be smoothed down. This preliminary preparation of the floor is very important.

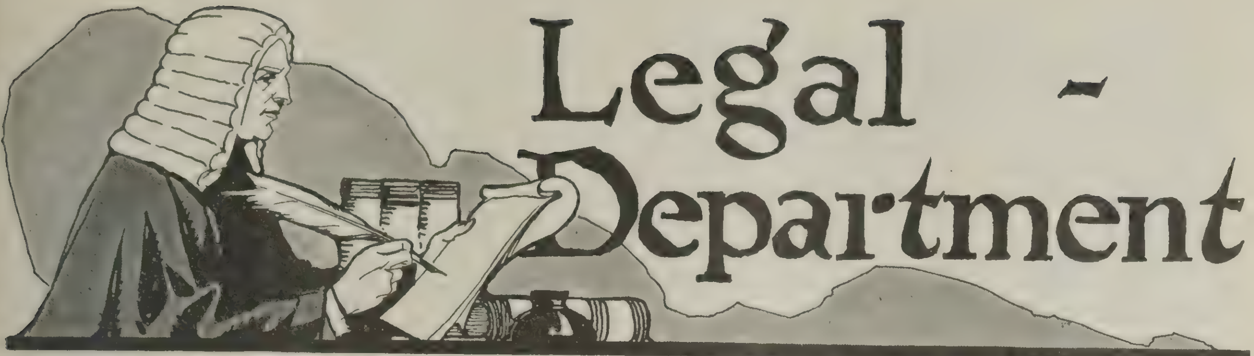
When moisture cannot escape, mildew or mold will set in. This explains why it is so essential to have the floor thoroughly dry.

New concrete floors cannot be considered absolutely dry in much less than three or four months after construction, depending on season, weather and other conditions. Moisture in the floor will neutralize the effects of *any* cement, and the action of mold or mildew will set in wherever moisture has no opportunity to evaporate. It is essential, therefore, that the linoleum be not laid until the concrete has had time to season and dry thoroughly.

Linoleum Is Frequently Used in the Hall

The following test may be used to determine whether or not concrete floors are dry enough to permit the laying of linoleum satisfactorily. Cut five or six pieces about four inches square, and place these *face downward* with the burlap side uppermost, one in each of the four corners of the rooms, and others in the center. These pieces should then be held down with a brick or some other object of similar weight, and allowed to remain at least eighteen hours.

If, when the pieces of linoleum are taken up, moisture appears on the surface of the floor or material, the room should be kept heated for four or five days, and the same test repeated. When no moisture appears following this procedure, it is then reasonably safe to lay the linoleum.



Legal Department

WERE BRICK PROPERLY SUBSTITUTED FOR STONE?

The text of this brief sermon will be found in a paraphrase of the ninth verse of the seventh chapter of St. Matthew: "What man is there of you, whom if an owner ask stone, will he give him brick?"

The lesson to be derived is that contractors cannot be too cautious in the matter of observing strict contract requirements concerning substitution of materials or other departures from specifications. And, hand in hand, goes the warning that assent of the owner's architect to a change does not bind the owner unless clearly within the scope of the architect's authority as agent for the owner.

All readers are invited to ask any questions that will help them solve any legal difficulty that they may be in. Our legal adviser will answer direct by mail and give his opinion as to the correct procedure. Questions and answers of general interest to the trade will be published in these columns. All inquiries must be accompanied by the name and address of the correspondent so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nome de plume. Remember that this service is free to subscribers. Address Legal Department, Building Age, 920 Broadway, New York City.

Plaintiff in the case of Pence vs. Dennie, 182 Pacific Reporter, 980, worked a hardship against himself, as building contractor, by substituting brick for artificial stone in the front of a building constructed for defendant, without observing the requirement of the contract that such changes should be made only on the written consent of the owner.

When plaintiff sued for a balance of compensation claimed under the contract defendant counter claimed for damages to cover the cost of replacing the brick construction with the artificial stone called for by the agreement. The California District Court of Appeal has affirmed an award of $1,000 in favor of defendant on this counterclaim.

Plaintiff started to install the stone work, but it was found to be defective. Defendant, the owner, being absent from the city, and it being doubtful that suitable stone material could be obtained without considerable delay, obtained the supervising architect's assent to the use of brick instead. The architect furnished details for the brick. The contractor saved nothing by the substitution, and the owner made no special objection when he returned home and discovered the substitution. But he never consented to the change, nor authorized it.

"There was a violation of the contract in furnishing defective stone work and in replacing it with brick without the written consent, or the consent at all, of the owner," says the District Court of Appeals. "The owner was entitled to have this stone front, and we are not prepared to say that the trial court was not, under the evidence, justified in allowing him damages. The measure of damages was the cost of replacing the work with the material called for by the contract; but in view of the fact that the value of the completed building was probably not greatly reduced by the substitution of brick for the artificial stone, it seems that this measure of damages, though a lawful one, places a harsh penalty on the contractor, especially in view of the fact that the owner's architect and superintendent both acquiesced in the change. However, neither of them is shown to have had authority to authorize such change in the general character of the structure, and, in any event, the authority was not obtained from the owner nor evidenced as specified in the contract. We do not think defendant is estopped from relying upon the terms of his contract that no changes should be made without his consent in writing. Had he known of the change when it was in process, and stood by without objection, the doctrine contended for by plaintiff might apply. But he did not know of it until it was done, and the fact that he then made no particular protest was in no way prejudicial to him."

WHEN IS WORK DONE TO OWNER'S "SATISFACTION?"

From M. L. H., North Dakota.—In the February issue of BUILDING AGE, page 31, a form of building contract appeared. Article 2 of the contract states "that the work shall be done to the entire satisfaction of the owner." Now, this may be all right in working on a percentage basis, where the owner pays the bills and the contractor is not limited to cost of construction, but where a contractor undertakes to build a house for a certain sum, I do not believe, from my own personal viewpoint, that words like this (that the work shall be done to the entire satisfaction of the owner or that you guarantee to suit the owner) would work satisfactorily in all cases, because there are people who sometimes go beyond reason, and, if I remember right, there was an article in BUILDING AGE some months ago, stating that the words should not be used. It seems to me that other language would be better.

Would like to know if there is a lien law in North Dakota, so that a contractor could file a lien on a house or building for work done or material furnished.

Answers.—The first question should be considered in two different lights—in a strictly legal aspect and in a practical aspect. Whether it is best, as a matter of policy in dealing with certain classes of owners, to refuse to undertake to build to the "satisfaction" or "entire satisfaction" of the owner is something that the law editor of BUILDING AGE feels must be left to the judgment of the builder, in the light of his experience and the experience of others coming under his observation. We address ourselves to the legal side of the question.

The law on this subject has been summarized as follows: "Where the contract merely requires the builder to perform the work according to certain plans and specifications it is not necessary, in case the work is so performed, that it also be performed to the satisfaction of the owner. Where, however, the contract so provides, the work must be performed to the satisfaction of the owner, unless the provision is waived. Such a provision is sometimes construed as not making the owner's declaration of dissatisfaction conclusive, but as requiring merely the performance of the work by the builder in such a substantial manner as ought reasonably to satisfy the owner, and it has been held that the owner or his agent cannot capriciously reject the work; his dissatisfaction must be in good faith and for good cause shown, but if for good cause he may in good faith refuse to accept the work. Thus a contract to install a heating plant in a manner satisfactory to the owner of the building has been held merely to require the installation of the plant in such a manner as should reasonably satisfy the owner, and not to permit the owner to express dissatisfaction as a matter of mere caprice; and the same has been held true with regard to a contract to do the polishing on the woodwork of a building to the satisfaction of the owner." 9 Corpus Juris, 744-745.

Among the courts that have decided that performance of a building contract in a way that would satisfy a reasonable-minded man is performance to the satisfaction of the owner are the appellate courts of Alabama, Arkansas, Illinois, Massachusetts, Minnesota, New York, South Dakota, Michigan and Pennsylvania. The Massachusetts Supreme Judicial Court seems to have voiced the general attitude of the courts in saying in the case of Handy vs. Bliss, 204 Mass. 513:

"There is no reason why the doctrine of substantial performance should not apply where the contract is to be performed to the satisfaction of the owner, according to the usual meaning of this expression as applied to contracts of this kind, namely, to his satisfaction, so far as he is acting reasonably in considering the work in connection with the contract."

In the case of McNeil vs. Armstrong, 81 Fed. 943, it was decided by the United States Circuit Court of Appeals, the second highest tribunal in the country, that a builder is entitled to recover under a contract calling for entire satisfaction to the owner, where satisfactory materials have been furnished and have been installed according to the plans and specifications governing.

In another Massachusetts case—Tobin vs. Kells, 207 Mass. 304—it was even held that a contract to do work to the "perfect satisfaction" of the owner did not require better performance than would suit a reasonable man.

The Alabama Supreme Court has fairly and aptly said that an owner is "bound to be satisfied when he has no reason to be dissatisfied."

In the case of Doll vs. Noble, 116 N. Y. 230, the New York Court of Appeals held that requirement in a building contract for performance to "entire satisfaction" of an owner is to be qualified by other provisions of the contract; he will not be permitted to deny liability to the builder on the ground of a dissatisfaction unreasonably and arbitrarily expressed.

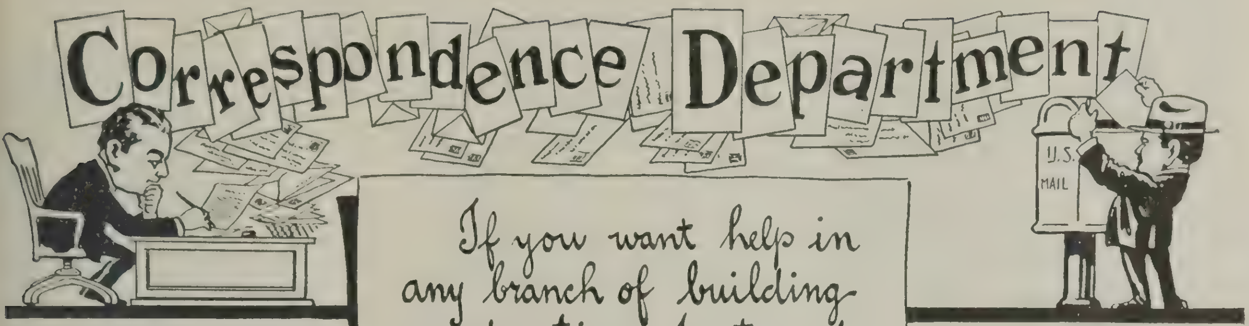
The Wisconsin Supreme Court decided in Laycock vs. Moon, 97 Wis. 59, that, notwithstanding inclusion of an "entire satisfaction" clause in a building contract, defects are deemed to have been waived where the contract also provides for performance in a workmanlike manner subject to inspection by the owner or his architect, and where the architect or owner stands by and permits defective work to be performed without objection.

But some courts take the view that the honesty of the owner's dissatisfaction is the true test. In other words, these courts make the test rest on the question whether the owner acts with actual dissatisfaction, rather than adopting the standard of abstract reasonableness.

On a consideration of what has been judicially determined on this subject, we are of the opinion that the prevailing rule is that if work is done in a workmanlike manner, and in accordance with the contract, it is done to the "satisfaction" of the owner, unless there happens to be something in the particular contract manifesting so reckless an undertaking on the builder's part as to absolutely insure the owner's satisfaction. We find no case that upholds the right of an owner to wickedly profess dissatisfaction for the purpose of defrauding the builder.

But, from a practical standpoint, it seems to us that it is often a hazardous thing to enter into such undertaking, because the owner, being unfamiliar, in all probability, with what the courts have said on the question, may view his contract as giving him power to reject work that is unsatisfactory to him, although done in accordance with the contract plans and specifications. Therefore, if we were in the building game we should be inclined to omit the "satisfaction" clause where possible to do it and at the same time secure a profitable contract.

Under the North Dakota statutes any one who performs labor upon, or furnishes materials for the erection, alteration or repair of any structure upon land, including fences, sidewalks, etc., is entitled to a lien on the structure and the land, if the work is done, or materials furnished, under contract with the owner or with his consent. There are numerous qualifications on the right to liens and the requirements of the statutes (North Dakota Compiled Laws, 1913, sections 6814-6831, as amended) should be consulted personally or through attorney in attempting to preserve and enforce a lien right. In addition to providing for giving of certain notices, the law requires a sworn account to be filed with the clerk of the district court for the county where the lien lies, within ninety days after the materials or labor has been furnished. If several liens are filed, they take priority in the following order: Manual labor claims, claims for materials, claims of sub-contractors, claims of original contractors. It has been held by the North Dakota Supreme Court that a supervising architect is entitled to a lien under these statutes for services in furnishing plans and specifications, etc.



Correspondence Department

If you want help in any branch of building construction, Just write to the Building Age Correspondence Dept.

We will be glad to answer all your questions without charge.

All readers are invited to discuss the questions and answers published.

THICKNESS OF WALLS

From B. L. J., Helena, Mont.—I would appreciate some information as to the proper thickness of foundation walls for dwelling houses and similar buildings. Is the same thickness necessary for both brick and stone? If not, please tell me what thicknesses are proper for these two materials.

Answer.—In districts where there is a building code the specifications governing such work as you mention must be followed in all cases. Where there is no existing law the following table will serve as a guide:

Thickness Foundation Walls—Dwellings

Height of Building	Thickness—Inches Brick	Thickness—Inches Stone
2 stories	12-16	20
3 stories	16	20
4 stories	20	24
5 stories	24	28
6 stories	24	28

Stone foundations should be at least 8 in. thicker than the wall above, for a depth of 12 ft. below grade level. For each additional 10 ft. or fraction the thickness should be increased 4 in. But in no case should a stone foundation be less than 16 in. thick, as a thinner wall does not bond well, makes the use of small stones necessary and cannot be carried up very high.

CHIMNEY FLUES SHOULD BE SEPARATE

From O. M., Birmingham, Ala.—Recently I was approached by a man who wanted my advice on his chimney. It did not draw well. On examination I found that it was an old affair with only one flue serving both kitchen range and furnace in the cellar. I told him there should be two independent flues, one for each. He thought I was wrong and we both agreed to leave it up to you. Please tell us briefly how to construct a chimney that will draw well.

Answer—In planning chimneys, the chief points to be considered are the height and the number, size and arrangement of flues. Attention must also be given to the location with respect to the ridge, valleys, etc., on the roof. To make a chimney draw properly there should be a separate flue from each stove, heater or fireplace to the top of the chimney. Ordinarily these flues may be 8 in. by 8 in., but if the furnace is large an 8 in. by 12 in. flue is better When it is necessary to make a turn in the flue sharp bends should be avoided as they retard the passage of the smoke.

Chimneys should extend above the highest point of the building or of the adjoining building. Sometimes, when the chimney has not been carried high enough, the resulting tendency to smoke may be avoided by using a hood having two open sides. In all cases the tops of chimneys should be covered with a stone slab. A solid slab will prevent rain coming into the flue and allow the smoke to pass out at the sides by raising it above the brick. Sometimes the entrance of rain is not considered important, but in these cases a stone cap should be used with a hole cut in it the size of the flue to prevent disintegration of the mortar joints in the brickwork.

PROPORTIONS FOR SCHOOLROOMS

From W. C. H., Easton, Pa.—I am figuring on a proposition for a small school building, and I need some information. What are considered good proportions for classrooms, seats spacing, etc.?

Answer—Ordinarily classrooms in small schools vary in width from 16 to 24 feet. The height of the ceiling should not be less than 12 ft. Where the floor area exceeds 360 sq. ft. this height should be 13 ft. and if over 600 sq. ft. the ceiling height should be 14 ft. In one-story buildings, where the ceiling may be raised to the tie-beams, the height to the wall plate may be 11 ft. and to the tie-beams 14 ft. Window sills should be 4 ft. from the floor.

In the junior classes a length of 14 to 16 in. is allowed for seats, while in the senior classes this length is increased to 20 or 24 in. Desks are 30 in. apart, back to back.

DIMENSIONS OF FLAGPOLE

From W. F. J., Ottumwa, Ia.—I want to put a 40-ft. flagpole on the roof of a building. What kind of wood should I use? What should be the diameter of such a pole and what kind of paint should I use to protect it from the weather?

Answer—Flagpoles may be made of spruce or pine. Oregon pine is preferable and, if the sapwood is entirely removed by cutting the pole from the heart of a large trunk, a durable pole is obtained. The diameter at the roof should be 10 in., or about 1/50 the height above the roof. The diameter at the top should be ½ the bottom, or 5 inches. Imgaine the flagpole cut into quarters. The diameter at the first quarter should be 15/16 the lower diameter, or 9⅜ in. At the second quarter the diameter would be ⅞ the lower, or 8¾ in. At the third quarter the diameter would be ¾ the lower, or 7½ in.

The pole should be painted with at least four coats of white lead and should be provided with a suitable cap at the top.

HOW I LOWER COSTS

Have you ever used any machinery or device which has saved you time and money?

Have you ever invented any way of doing a piece of work quicker?

If you have BUILDING AGE wants your experience, and will pay regular space rates for it.

Your description should tell just how you saved time and money either by a special way of using machinery or by short cuts in construction. Point out what methods you were using before adopting your "Time Saver" and show how your new method turns the trick. You can submit as many articles as you want.

Address The Editor, BUILDING AGE, 920 Broadway, New York City.

PREVENTING DECAY OF PORCH POSTS

From E. T. J., Dayton, Ohio—How can I prevent wooden posts from decaying at the point where they rest on the floor of the porch?

Answer—The decay of veranda posts referred to is due to a capillary action that draws water from the floor of the porch up into the cracks and pores of the wood post. This happens every time it rains and when the porch is washed. If the bottom of the post is allowed to rest upon an iron shoe so that there is no contact between the post and the porch floor the absorption of water and the consequent decay of the posts will be to a large extent avoided.

HOW MUCH WINDOW SPACE IS NECESSARY?

From G. B. C., Covington, Ky.—Please tell me through the columns of Building Age how many 30 in. by 60 in. windows I should use in a room 16 ft. by 20 ft. in order to secure adequate lighting. Is there a good rule for figuring the amount of window space necessary for a given size of room?

Answer—There is quite a variation in the relation of the areas of window space and floor area, as recommended by the authorities on the subject. Naturally a lot depends upon the intensity of light required in the room. For ordinary purposes the following formula has been found to give satisfactory lighting and it is perhaps better than others that do not take into consideration the depth of the room.

$$w = \frac{A}{5} + \frac{d^2}{36}$$

where,

w = window area (sq. ft.)
A = floor area (sq. ft.)
d = depth room (feet)

The floor area of the room referred to above is 320 sq. ft. Assuming that 16 feet is the depth, the window area would then be 71.1 sq. ft. Each 30 in. by 60 in. window has an area of 12.5 sq. ft. The number of windows required would, therefore, be six.

PAINTING BRICKWORK

From J. N., Danbury, Conn.—Please tell me how to paint brickwork to make a good job of it.

Answer—Brickwork must be thoroughly dry before attempting to paint. To get satisfactory results the brick must be prevented from absorbing the oil in the paint before it has a chance to dry. This is done by first applying two coats of raw linseed oil with ½ pint of oil dryer added to every gallon of oil. Each coat should be applied full and allowed to dry 10 days. The finishing coats of oil paint may then be applied.

PROPORTIONING CONCRETE FOR VARIOUS KINDS OF WORK

From E. G. L., Hagerstown, Md.—In what proportion should concrete be mixed for reinforced concrete floors? Will the same mixture answer for foundations? If not, what mixture should be used?

Answer—Experience has shown that the following mixtures give the best results for different classes of concrete work:

1:2:3 *mixture*—For roadways, concrete walks, etc.

1:2:4 *mixture*—For reinforced concrete work such as beams, columns, floors, walls, etc.

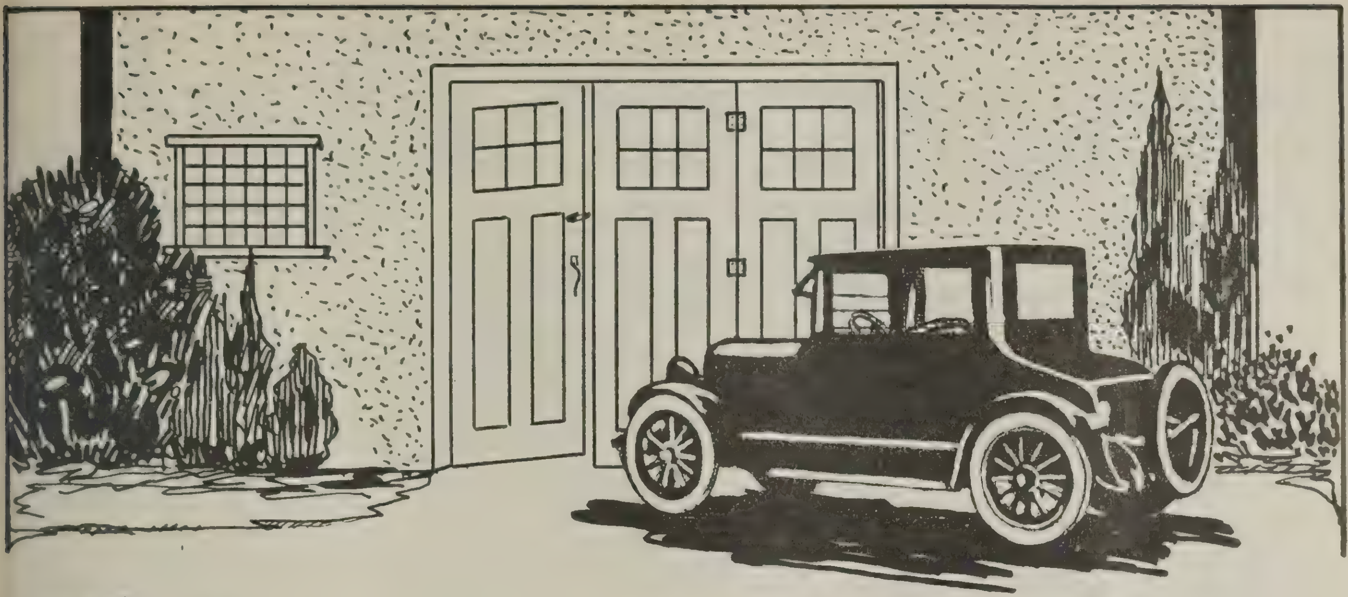
1:2½:5 *mixture*—For base course for sidewalks, floors, pavements, etc., and for basement walls not necessarily watertight, foundations, etc.

1:3:6 *mixture*—For mass construction, large foundations and foundations.

QUICK RULE FOR DETERMINING AMOUNT OF CEMENT FOR MORTAR

From G. C., Buffalo, N. Y.—Can you give me a quick rule of thumb method of estimating the cement needed for mortar for brickwork?

Answer—Naturally the amount of cement required for mortar is going to depend upon the proportions of the mortar and the thickness of the joint. The mortar generally used for brickwork is composed of 1 part of cement and 3 parts of sand. The joint is usually from ⅜ in. to ½ in. thick. Under these conditions 1 barrel of cement is required for every 735 brick laid. Now, for a 13 in. wall there are 21 common brick used per sq. ft. of wall surface. One barrel of cement will, therefore, take care of 35 square feet of a 13 in. wall. Other thicknesses of wall may be figured in proportion.



The Importance of having the Best

Automobile owners today are giving careful consideration to the materials and equipment that go into the construction of their garages. Of especial importance is the question of garage door hardware. It is essential that Builders use only the most efficient sets.

NATIONAL
Nos. 805 and 806
Garage Door Sets

provide for free and easy access to garage at all times because one door is so hung that it will open without disturbing the other two doors. Garage doors hung with this set will work as freely as any house door. There is absolutely no binding or friction and doors are adjustable in case of swelling or raising of cement floor. It is the most economical and efficient set you can offer your customer.

Send for Garage Plan Booklet "F" and give dealer's name

National Mfg. Co.
Sterling, Ill.

: New Catalogs and Publications :

These catalogs may be secured direct from the manufacturer. If you prefer, write the date of this issue and the numbers of any catalogs on a postal and mail it to "Building Age," 912-920 Broadway, New York City, The catalogs will be sent you without charge or obligation.

545. **Goodell-Pratt Co., Toolsmiths, Greenfield, Mass.**—Builders will be interested in the pocket-size book issued by this company. The book illustrates and describes over 2,000 sizes and kinds of tools for toolmakers, machinists, motorists, carpenters and householders.

546. **Grinnell Bulletin.** The Grinnell Co., 277 West Exchange St., Providence, R. I., fire-prevention specialists, have issued Bulletin No. 104 discussing methods of installing a hot water heating system, methods of Grinnell fire prevention and other timely matters.

547. **National Fire Protection Association, 87 Milk St., Boston, Mass.** Structural defects influencing the spread of fire are illustrated by diagrams and sketches in the bulletin here noted. Suggestions for their elimination and protection are given. The contents includes sheathing and plastering, boxed cornices, attics, stairways, elevators, wall and floor openings, skylights. Ten cents sent to the above address will secure a copy.

548. **Blabon Art Linoleums** are depicted in color in a 140-page booklet issued by George W. Blabon Co., 212 Fifth Ave., New York. Ample text is included, and there are pictures of rooms decorated with linoleum. The booklet has suggestive value.

549. **The Art Brass Co., 299 E. 134th St., New York,** sends out a good circular describing San-o-la products for the bathroom. The value to the reader lies in the timely methods given for giving refinement and convenience to the bathroom—one of the most vital rooms in the house.

550. **Kewanee Private Utilities Co., Kewanee, Ill.,** are circulating Bulletin H, which covers private sewage disposal plants by valuable text and diagrams.

551. **Newman Manufacturing Co., 717 Sycamore St., Cincinnati, Ohio,** have prepared a complete catalogue on the ornamental brass and bronze work manufactured by them. It contains 64 pages of illustrations and suggestions.

552. **Structural Service Data and Standards** covering full discussion of structural slate as affecting (1) stairways; (2) toilet enclosures, may be obtained from the Structural Service Bureau, Philadelphia, Pa. Characteristics of slate are given, and details and specifications are shown in text and illustrations.

553. **The Armstrong Cork Company, Lancaster, Pa.,** issues an exceedingly helpful book on the Art of Home Furnishing and Decoration, the text of which is written by Frank Alvah Parsons, well-known authority on this topic. Full page color plates showing the use of linoleum in various rooms of the house are included. Twenty cents sent to the Armstrong Cork Co. will secure it.

554. **Metal Forms Corporation, Milwaukee, Wis.,** has issued a comprehensive booklet on Metaforms as solving the question of concrete forms. Details of construction and variety of uses are fully discussed and there are many illustrations to amplify the explanation.

555. **The above forms** are rectangular but the Metal Forms Corporation of Milwaukee also manufactures metaform outfits for circular concrete work. These are also standardized and offer the same advantages of durability and economy as the first mentioned.

556. **Daylighting.** The American 3-way-Luxfer Prism Co., 139 Spring St., New York, has printed an informative and valuable booklet on this subject. It is fully illustrated and contains specifications, details, diagrams and other useful discussion. This is their catalogue 21.

557. **The Kelley Floor Machine** is a versatile instrument described by the Kelley Electric Machine Co., manufacturers of portable electric driven tools, 1407 West Ave., Buffalo, N. Y. It is for scrubbing, waxing, polishing, refinishing all floor surfaces, carpets, rugs, tile, marble, etc., according to the claims. Their interesting folder shows how, when and why.

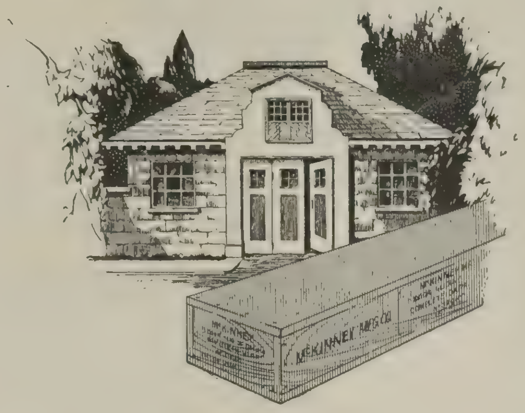
558. **Zapon Lacquers and Lacquer Enamels.** The Celluloid Zapon Company, New York City. Illustrated catalog describing the product of this company, which is applicable to all metal or wood surfaces and is claimed to be absolutely waterproof. These lacquers and lacquer enamels are supplied in all colors and can be applied either by brushing, dipping or spraying.

559. **Adsco Angle Fittings.** American District Steam Company, North Tonawanda, N. Y. Illustrated bulletin No. 153 illustrates and describes these special fittings which are suitable for use wherever it is necessary to make angle joints in a pipe. They are adjustable and any angle can be taken care of.

560. **Globe Ventilators.** The Globe Ventilator Company, Troy, N. Y. A little booklet profusely illustrating buildings of all kinds and types equipped with Globe ventilators. The booklet also contains mechanical description of this ventilator.

561. **Filters for Natatoriums.** Norwood Engineering Company, Florence, Mass. Illustrated pamphlet describing the Norwood Engineering Company's system of recirculation and refilteration of water for swimming pools. This explains the advantages and economy of this system over constantly supplying fresh water. The pamphlet also contains photographs and detailed drawings of the equipment, together with a table showing capacities, sizes, et.

562. **Hastings Asphalt Block Floors.** Hastings Pavement Company, New York City. Interesting report issued by this company on Hastings Asphalt Block Floors, which also includes illustrations of their application. The selection of the proper type of flooring material where there is heavy traffic, either indoors or out, in industrial buildings, railroad stations, schools, etc., is so important that builders will be interested in this standard size folder.


McKINNEY MFG. CO.

When You Plan a Garage

THE greatest advantage of McKinney Complete Garage Sets to Architects and Builders is that they promote rather than limit a wide range of design. When you plan a garage with these sets in mind, you know your plan will be followed down to the last line and your client satisfied.

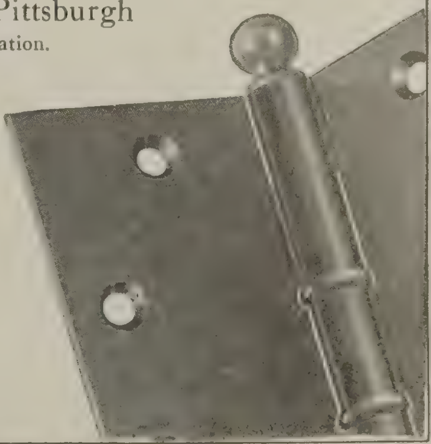
These sets contain all the hardware necessary for garage doors—even the track. With drawings and directions, they are packed complete in a box—no odds and ends to buy afterward. The doors may be the swinging, sliding-folding, or if space is particularly limited, "around-the-corner" type. There is a set for any size or any style doors you wish used.

McKinney Complete Garage Sets have been given the same careful attention that is responsible for the worth and work of McKinney Hinges and Butts. Fifty years of association with the development of builders' hardware serves advantageously in meeting the needs of the Architect and Builder.

McKinney hung garage doors are pictured and explained in book form. This book shows how easily the sets are installed and how they make better looking, stronger and more protective doors possible. It points a way toward lower building costs and illustrates the possibility for varied designs. This book and the McKinney Catalog will be forwarded upon request.

McKINNEY MANUFACTURING CO., Pittsburgh
Western Office, Wrigley Bldg., Chicago. Export Representation.

McKINNEY
Hinges and Butts



Also manufacturers of McKinney garage and farm building door hardware, furniture hardware and McKinney One-Man Trucks

563. Webster Oil Separators. Warren Webster & Company, Camden, N. J. Attractive 8-page folder describing and illustrating, both by photographs and sectional views, the Webster oil separators for the removal of cylinder oil, grease, etc., from exhaust steam.

564. Magnolia Slag Cement. Southern Cement Company, Birmingham, Ala. Booklet illustrating and describing the Magnolia-non-staining white cement manufactured by this company. This cement has been used extensively in the laying of marble, limestone, terra cotta, etc., because of its non-staining qualities. Many views of buildings in which Magnolia cement has been used are shown. This booklet also contains reports of Testing Laboratories, etc.

565. Bulletins. Cement-Gun Company, Inc., Cornwells, Pa. Interesting folder containing bulletins issued by this company on cement-gun construction. These bulletins include reports showing results of tests made on Gunite slabs, together with working tables and safe load tables. Information about the use of the cement-gun for general concrete work and for plastering and stucco work is given. There is also a bulletin describing the use of this machine for waterproofing, etc.

566. Ogden Turnover Doors. J. Edward Ogden Company, Inc., New York City. Descriptive pamphlet describing and illustrating turnover doors which are intended primarily for use on piers, warehouses, garages, shops and industrial buildings for either exterior doors or elevator doors where fireproof qualities combined with space saving are essential.

567. Questions Answered. Atlantic Terra Cotta Company, New York City. Booklet containing illustrations of notable buildings in which Atlantic Terra Cotta has been used both for exterior and interior service. A series of questions is asked regarding terra cotta and answers are given in full.

568. Sharp Rotary Ash Receiver Corp., Third National Bank Bldg., Springfield, Mass., tells how to make the home worth more and eliminate a large amount of inconvenience. Ashes and ash cans are kept out of sight, ash dust and shoveling are forgotten. This installation gives room in the cellar for a laundry.

569. A Collection of Successful Designs. The Kawneer Company, Niles, Mich. Booklet presenting by means of drawings and photographs the different styles of store fronts suitable to different lines of business, that have proved most successful. These include jewelry stores, women's wear stores, men's wear stores, banks, restaurants, shoe stores, and practically every type of business that one can think of.

570. Standard Electric Ranges. An all-purpose electric range is discussed in the literature of the Standard Electric Stove Co., of Toledo, Ohio. It occupies but 18 x 28 inches of floor space and has a shelf above on which the cook may put hot dishes out of her hands. The present model No. 301 is a fireless cooker and there are others as well.

571. Mar-Sla. This is a case-hardened stone made by the Mar-Sla Mfg. Co. of Hubbard, O. It is particularly useful where acids would penetrate and mar other materials and is used for lavatories, laundries, tabletops, acid tanks and numerous other purposes. All dimensions are standardized to permit of ready replacement.

572. Sand's Levels. Carpenters and mechanics will be glad to know Sand's Levels. They may be used confidently on the most technical work and are accurate in their precision. They are non-adjustable and therefore fool-proof. This type comes in walnut, while others of light aluminum are excellent for overhead work.

573. Smith Excavator. A catalogue describing details of the Smith Excavator and Loader has been published by the T. L. Smith Co., Milwaukee, Wis., and may be had from them under the name Bulletin 408. Half of the catalogue shows the machine in action and half gives details of its construction.

574. National Lime Association, Washington, D. C., has issued Bulletin 300 on Brick Mortar which outlines a series of interesting tests on brick piers. The tests show that the contact betwen the mortar and the brick is more important than the strength of the mortar itself.

575. Stuko-Steel Houses. Builders should know about the work of the Stuko-Steel Co. in Youngstown, O. A free book will bring interesting information on methods of constructing attractive houses of fire-resisting material, that commend themselves also for economy and beauty.

576. United States Radiator Corp., Detroit, Mich., has recently issued a booklet describing smokeless boilers. These permit of burning bituminous coals without smoke. The public realizes the menace to health of soft coal smoke, and the large monetary loss due to the escape of unburned gases in the form of smoke. It is interesting to see how these things are being solved by progressive manufacturers.

577. "The Yellow Strand" describes the strength and ruggedness of ope made by the Broderick & Bascom Rope Co. of St. Louis, Mo. For builders who need rope for hauling, hoisting, or any other purpose, this yellow strand wire rope is absolutely dependable.

578. Sedgwick Machine Works, 150 W. 15th St., New York, have a series of leaflets on Invalid Elevators, Brass Tube Dumb Waiters, Under Counter Dumb Waiters, Hospital Elevators and Iceless Refrigerators which will prove of interest to the progressive builder and home owner.

579. Practical Information and Constructive Features in Erecting Eaves trough, Conductor Pipe and Roof Gutter, may be obtained from C. G. Hussey & Co. of Pittsburgh, Pa. This article is well written and covers the latest methods of applying conductor pipe, etc. This, together with other information to be issued later, will form the basis of a valuable reference work to builders and metal workers.

580. Building Estimator's Reference Book. Frank R. Walker Co., 2209-B Archer Ave., Chicago, has just printed the 1921 edition of this highly valuable book. 2,100 pages brimful of money-making suggestions for contractors. Complete estimating data in all its branches is included. Book will be sent on five days' approval.

581. Alpha Portland Cement Co. will supply valuable service sheets just prepared, on Ornamental Concrete Facades, Cast-Stone Wallfacing, Doorways, Cornices, Columns, etc., of interest to every builder.

582. Bird & Son, Inc., East Walpole, Mass., will furnish literature on Art-Craft Roofing and on Birds' Neponset Black Building Paper which they claim saves fuel, stays waterproof, keeps out drafts and dampness and lasts as long as the building.

583. Kodak on the Job. 525. Eastman Kodak Company, Rochester, N. Y., publish a catalog illustrating and describing Kodaks which have the autographic feature. This provides for making on the negative a written record of building operations step by step.

The Need for New Roofs Is Your Opportunity

For every new construction contract there are ten repair jobs to be had—*if you go after them.* In every community the spring rains have left hundreds of buildings in urgent need of re-roofing. One of the main advantages of the famous Barrett Everlastic Roofings is that they are as perfectly adapted for laying over the old shingles as they are for use upon the roof boards of new buildings.

Make *your* customers understand that they can have beautiful, durable Everlastic Roofs at small expense, without the cost and mess of ripping off the old shingles. Then you won't *have* to wait for the building boom to boost your business!

Barrett Everlastic Roofings are carried by enterprising dealers everywhere. And there's a type for every steep-roofed building. The four styles noted at the right are fully described in illustrated booklets which we gladly send to any address upon request.

The Barrett Company

New York Chicago Philadelphia Boston St. Louis Cleveland
Cincinnati Pittsburgh Detroit New Orleans Birmingham Kansas City
Minneapolis Dallas Nashville Syracuse Seattle Peoria Atlanta
Duluth Salt Lake City Bangor Washington Johnstown Lebanon
Youngstown Milwaukee Toledo Columbus Richmond Latrobe
Bethlehem Elizabeth Buffalo Baltimore Omaha Houston
Denver Jacksonville

THE BARRETT COMPANY, LIMITED
Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S.

Your Choice of Four Styles

Everlastic Multi-Shingles. The newest thing in roofing—*four shingles in one.* Tough, elastic, durable. Made of high-grade waterproofing materials and surfaced with crushed slate in art-shades of red or green. When laid they look exactly like individual shingles and make a roof worthy of the finest buildings. Weather and fire-resisting. Need no painting.

Everlastic Single Shingles. Same material and art-finish (red or green) as the Multi-Shingles, but made in individual shingles; size, 8 x 12¾ inches. A finished roof of Everlastic Single Shingles is far more beautiful than an ordinary shingle roof and, in addition, costs less per year of service.

Everlastic Slate - Surfaced Roofing. The most beautiful and enduring roll roofing made. Surfaced with crushed slate in art-shades of red or green. Very durable; requires no painting. Nails and cement in each roll.

Everlastic "Rubber" Roofing. This is one of our most popular roofings. Thousands upon thousands of buildings all over the country are protected from wind and weather by Everlastic "Rubber" Roofing. It is tough, pliable, elastic, durable and very low in price. It is easy to lay; no skilled labor required. Nails and cement included in each roll.

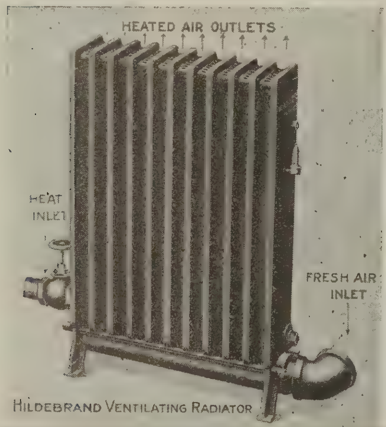
Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to
do with the Various Branches of the Building Business

Novel Heating and Ventilation Equipment

WM. R. HILDEBRAND, of 903 Lawrence Ave., Chicago, has completed a new ventilating radiator on which patent has been granted. This new radiator, the first working sample of which has just been placed in operation, produces a constant air suction, and air circulation by means of an adequate surface of contact, whereby air is most readily and most efficiently heated. Connected with the outside, this new radiator sucks in fresh air, heats it to an agreeable temperature and distributes it freely throughout the room. It is thus adapted to take in fresh air continuously from out of doors and supplant the vitiated air of the living room, office or workshop without subjecting the occupants to cold draughts.

The construction is simple. There is an air inlet running parallel with the heat inlet and these two conduits carry and distribute heat and air. The radiator gets into action as soon as the steam is turned on; a touch of heat will start the air to circulate through the alternate air sections and the work of distributing warm air is well under way. Needless to say, the action is entirely automatic and the air suction, air blowing or air circulation is brought about by the "stack effect" of the heated air in the radiator.



HILDEBRAND VENTILATING RADIATOR

Heating and ventilating are thus performed by one and the same apparatus, which heats the intake air by direct contract and the surrounding objects by radiation.

New Wire Scratch Brush

THIS picture shows the "Haskins" Type H-6 Equipment in operation on the Hanna Building, Cleveland, Ohio, cleaning stone by means of a wire scratch brush. There are four of these machines used on this building; each machine doing an average of 520 square feet per day. The contractor estimates that his machines are doing the work which would normally require sixteen men. The stone was thoroughly cleaned, giving it a uniform color by means of this equipment.

The same equipment is used extensively for cleaning form marks on concrete immediately after the forms are removed, as well as removing rust from fences and grilles, etc., before painting, and is manufactured and sold by the H. G. Haskins Company, Chicago, Ill.

The Reeves Mitre Clamp

THE Reeves Hardware Mfg. Co., 4824 West Lake Street, Chicago, Ill., has placed on the market a new Mitre Clamp which clamps together mitered and analogous sections while gluing or nailing them.

It is described as simple and practical and will engage the mitered ends of two members and hold them in such fashions that they will not split when nailed together. It has a frameplate upon which is slidable mounted a clamping plate, the frameplate being provided with flanges having notches therein to permit nailing.

In operation a pair of mitered sections are positioned in the clamp, which then is tightened to force the mitered ends into close engagement with each other, the clamping plate engage the mitered sections and prevent any possibility of splitting when fastener are driving into the sections through the notches.

Trouble is often caused by the ends of the mitered members splitting when secured by nails.

This clamp prevents the splitting action by having the flanges form a closed angle.

The Reeves Mitre Clamp is made in one size, nine by four and one-half inches, and is furnished nickel plated and black enamel, is made of malleable iron.

.54
B
Arch.

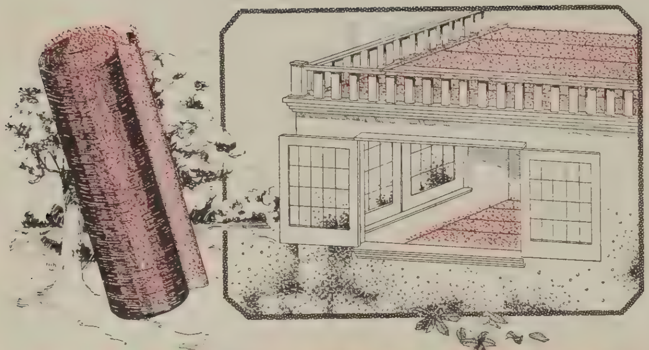
JULY 1921

Building Age

UNIVERSITY OF ILLINOIS LIBRARY
JUL 16 1921

43RD Year

25 Cents



CON-SER-TEX

CANVAS ROOFING

FOR ROOFS AND PORCH FLOORS

FOR sun parlors, sleeping balconies, and all flat surfaces, it is ideal. Chemically treated so that it will not crack, stretch, shrink, curl or peel. The burning sun, and warm rotting summer rains will not affect it.

Con-ser-tex is a business-getter, used where more expensive materials are not wanted. It stands up well under severe use, and looks attractive. Recommended by responsible builders and contractors in all parts of the United States.

It is well worth your while to write for our illustrated booklet, "Roofing Facts and Figures," and for samples.

WM. L. BARRELL CO.

50 Leonard Street New York City

Chicago Distributors:
Geo. B. Carpenter & Co.
430-440 North Wells St.

California Distributors:
Waterhouse-Wilcox Co.
San Francisco & Los Angeles

FLOORS

The Wood-Mosaic Kind

For every home—Old or New. Can be installed by your mechanics. Our 5/16″ flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood Carpet, strips Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalogue in natural wood colors.

Wood-Mosaic Company
New Albany, Indiana

Fiberlic Wall Board

The *material* from which it is made, the fact that the pulp is *chemically cleansed* and that the *fibre lengths* give the finished product that *natural reinforcement* that is lacking in ground wood boards, is in itself a guarantee of the superiority of Fiberlic for *strong, permanent, economical* and *sanitary construction.*

MacAndrews & Forbes Company
200 Fifth Avenue, New York City
Factory: Camden, N. J.

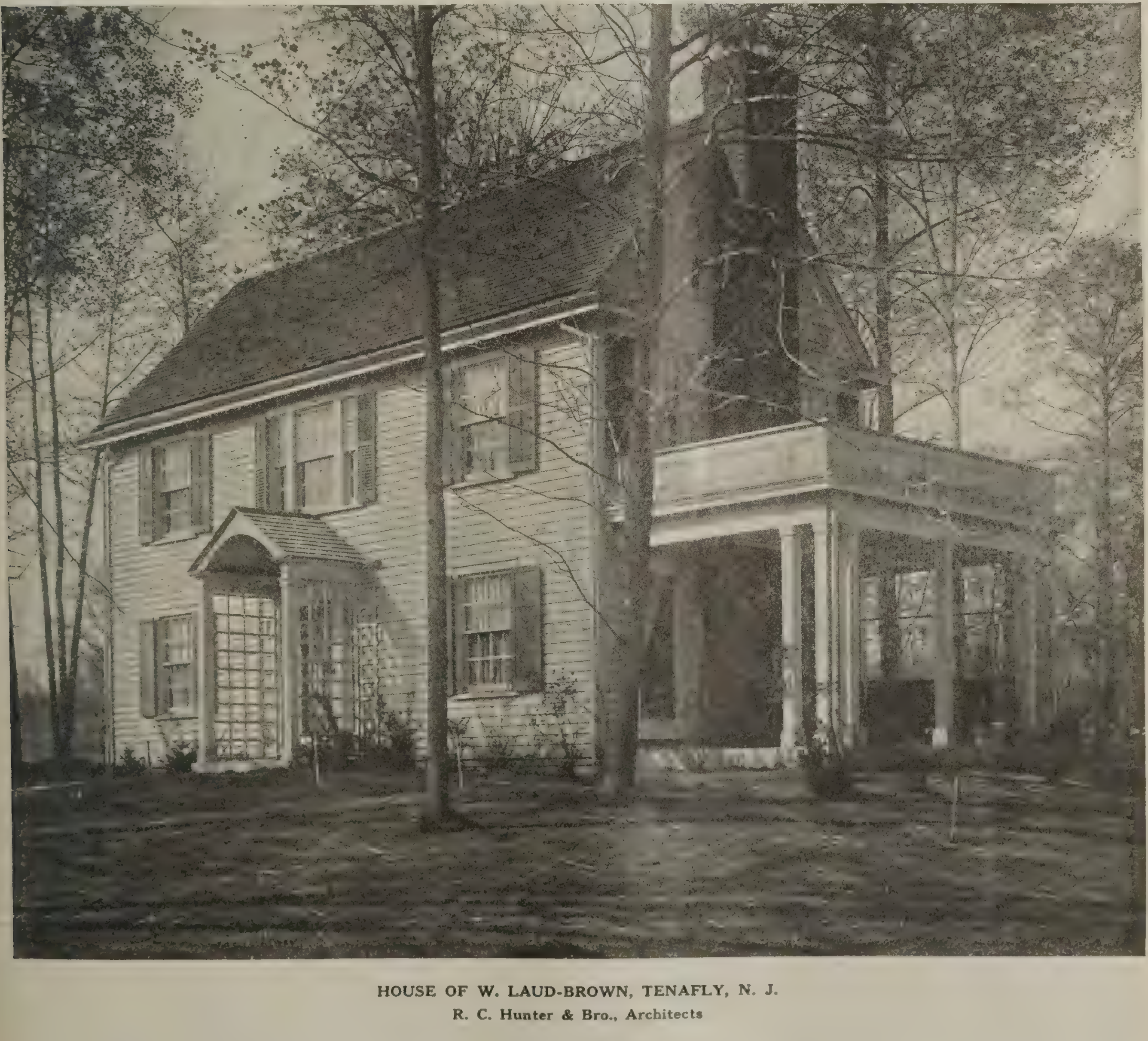
BUILDING AGE

NEW YORK, JULY, 1921

Two Homes That Reflect the Spirit of Country Life

SIMPLE, yet pleasing in design; roomy, yet economical in plan, set close to the ground and surrounded by numerous trees, the house of W. Laud-Brown makes an ideal, livable home.

Plans of the first and second floors show that it is modest in size. The first floor rooms are no larger than is required for their various uses, compatible with comfortable living, in fact, space has been reduced to effect economy so that every foot is utilized, yet, above this small area we have the desired four bedrooms,



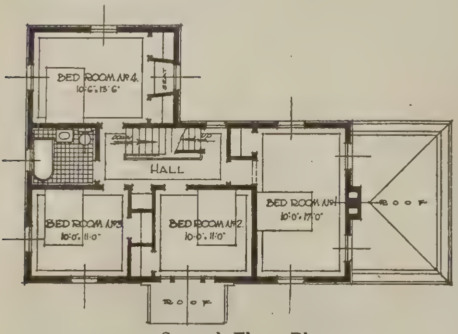
HOUSE OF W. LAUD-BROWN, TENAFLY, N. J.

R. C. Hunter & Bro., Architects

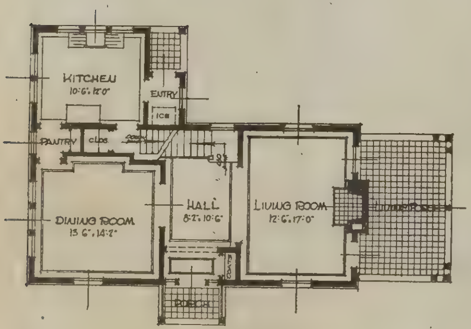
of good size, plenty of closet room, a bath, a comfortable hall, and a servant's room and bath on the third floor.

A third floor in a small house that is low in appearance and with no ugly dormers to break the grace of the roof, this is a real achievement both from the standpoint of economy and beauty. It requires very careful study of the proportions of the building, ceiling heights and roof pitch.

The cellar of this house provides a laundry, heater and other utility rooms.



Second Floor Plan



First Floor Plan
House of W. Laud-Brown

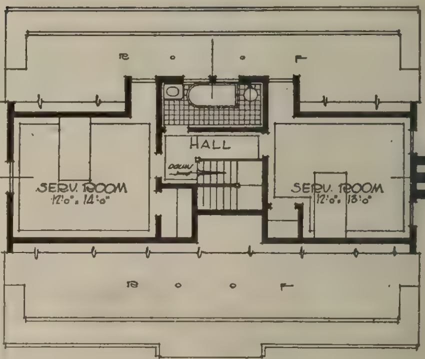
THE house of Mr. Barber presents a successful solution of the economic problem as applied to home building. Economy in plan, economy in materials and construction, combined with the economy of a pleasing exterior.

The house measures but forty by twenty-six feet, yet provides four good bed rooms and two baths on the second floor, with at least one closet to each room; a convenient hall and a linen closet. While the servant's quarters consisting of two rooms and a bath are provided on the third floor, thus by slightly increasing the pitch of the roof this space is utilized which would otherwise have been lost.

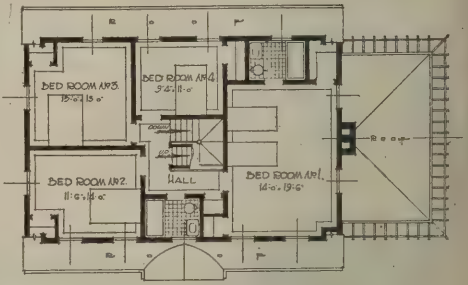
Worthy of note is the compact arrangement of the stairs, they occupy a very minimum of space but are easy and comfortable.

The cellar provides a laundry, cold storage and heater rooms.

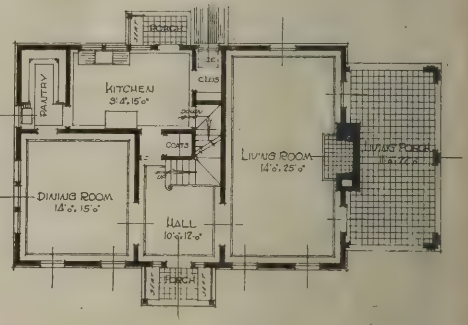
The Dutch roof gives the house a delightful low appearance that fits well on the elevated site while the broad dormer with its five large windows makes the bed rooms comfortable and cheerful.



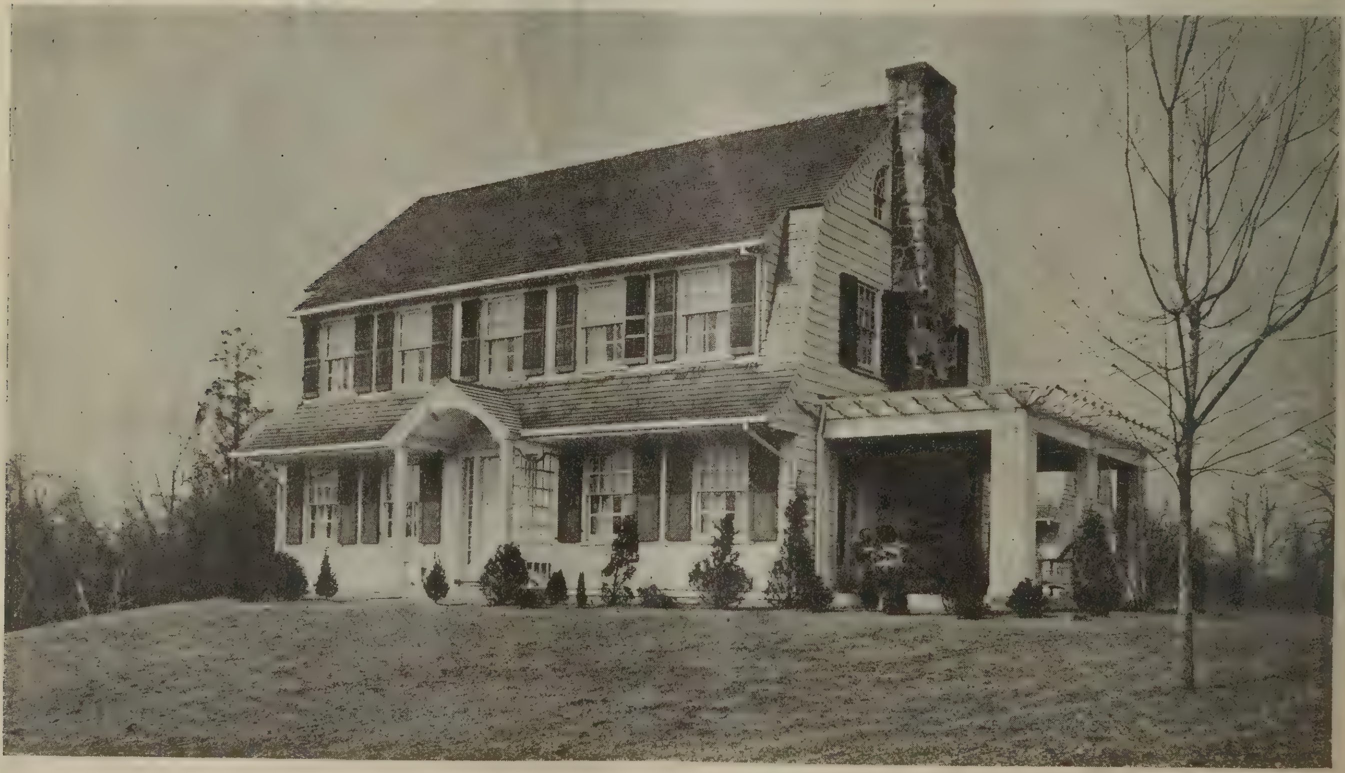
Third Floor Plan



Second Floor Plan

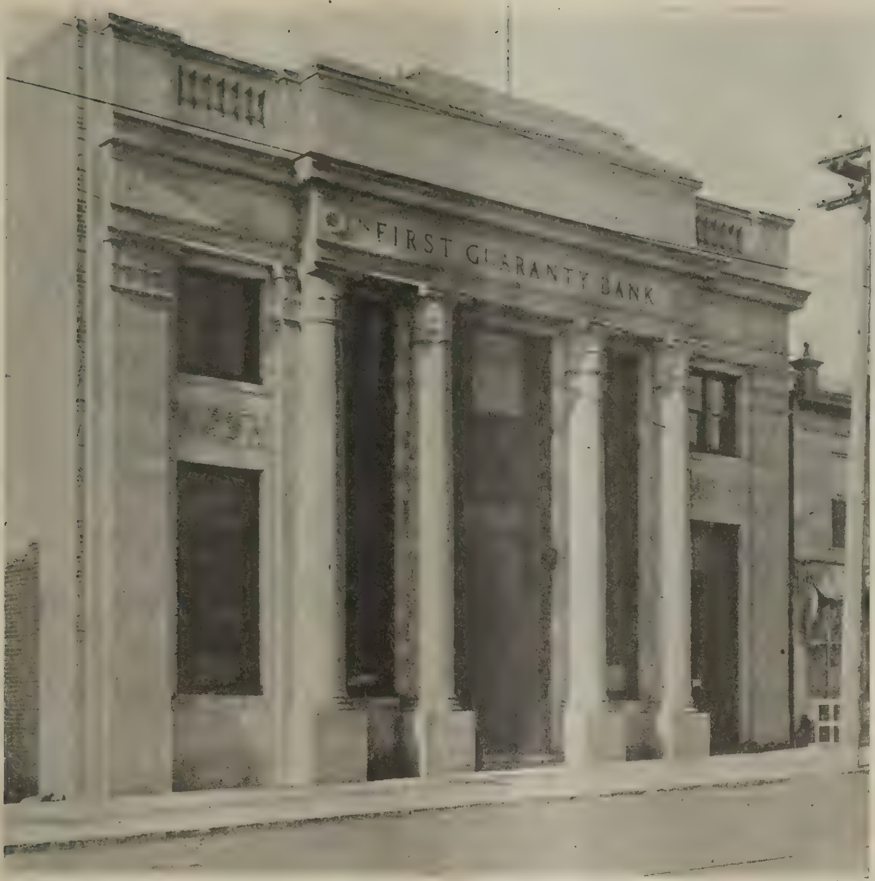


First Floor Plan
House of Philip P. Barber



HOUSE OF PHILIP P. BARBER, TENAFLY, N. J.
R. C. Hunter & Bro., Architects

First Guaranty Bank, Bismark, N. D.



Stone front and Corinthian columns give pleasing effect

Bank Buildings of Dignified Aspect

Illustrating Banks Built by the A. Moorman Company Bank Builders—Three Designs That Create Proper Atmosphere

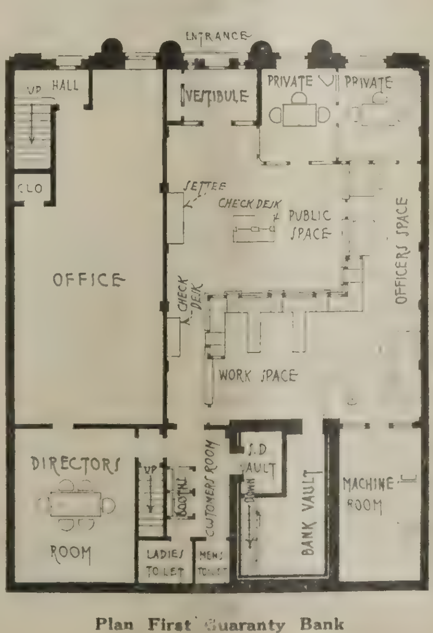
THAT bank building has become a specialized branch of the building industry is evidenced by the success of builders who do this class of construction. Some of the best examples done by the A. Moorman Company of St. Paul, Minn., who have established a reputation for designing and erecting good banks, are shown with this article.

Speaking generally, how does a bank differ from any other kind of building? What is the reason for this difference?

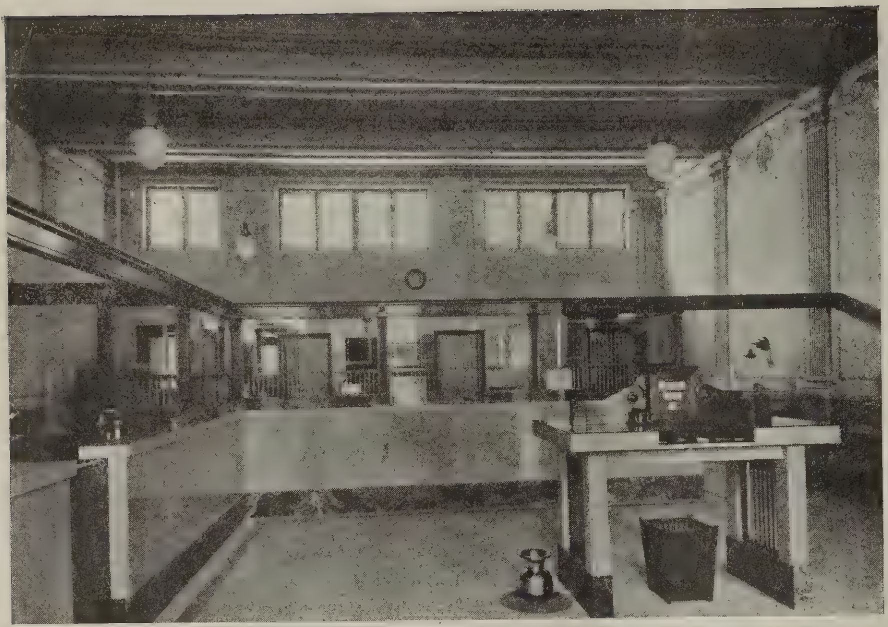
The design of buildings is, to a very large extent, governed by the character of the business that is to be conducted within its walls. The banking business is one that is founded upon public confidence, first of all. And public confidence, we know, rests upon the knowledge that the business methods will be straightforward, open, honest, and that the business itself is solid and substantial.

It is interesting to see, therefore, how bank builders endeavor to design such buildings so that they will have the same atmosphere as the business itself and will convey to the public an impression of the honesty and solidarity of the transactions that are carried on within the doors.

Since these factors are of primary importance to the banking business, it is but natural to expect that they will be given the first consideration in the design of the building itself. We find, therefore, that the exterior of a bank has a tendency toward a solid and substantial type of construction. Stonework figures largely in its



Plan First Guaranty Bank



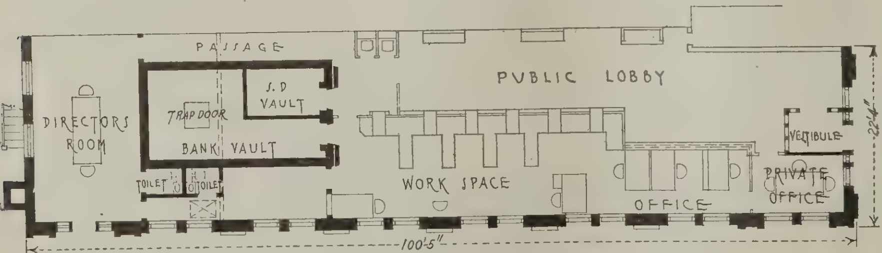
Interior First Guaranty Bank Showing Glass Partitions in Metal Frames

make-up. Columns are apt to have a massive appearance. Where the building is occupied by the bank alone it is likely to be wider than it is high in order to further impress the idea of stability. Where a narrow frontage will not permit this, the designers must resort to columns, pilasters or other devices to emphasize the substantial character of the building.

So much for stability. The open, straightforward policy upon which the business is conducted must also be brought out in the design. This is partially accomplished by large windows, plenty of them and low sills, to enable the public to see everything that is going on inside. Of course, this large window space also affords excellent lighting to bookkeepers and clerks, whose eyes are their stock in trade and are under considerable strain, even under the best conditions.

Frills and fancy scroll work are not found in good bank design. Instead, there is always found the atmosphere of severe simplicity and openness. This is expressed particularly well in the interior design. The clean, cold, hard marble with its straight lines and sharp edges is indicative of clean, straight-lined business dealings. Glass partitions show that everything is done open and above board.

There is one other important feature of bank design that has not been mentioned. It is but natural that depositors wish to have the feeling that their money is secure, that the bank is proof against burglars. Many years ago it was customary to provide the windows with heavy iron bars, not only to convey this impression to depositors and prospective depositors, but, in those days, for actual and real protection against theft from the outside. Modern banking has provided itself with sufficient inside protection against outside theft to cause the gradual disappearance of these unsightly bars from later designs. They are survived, however, by the little artistic barred window at the teller's cage. But the security from theft is exhibited in a very realistic way by the huge safe with its massive door, all within a heavy iron cage.

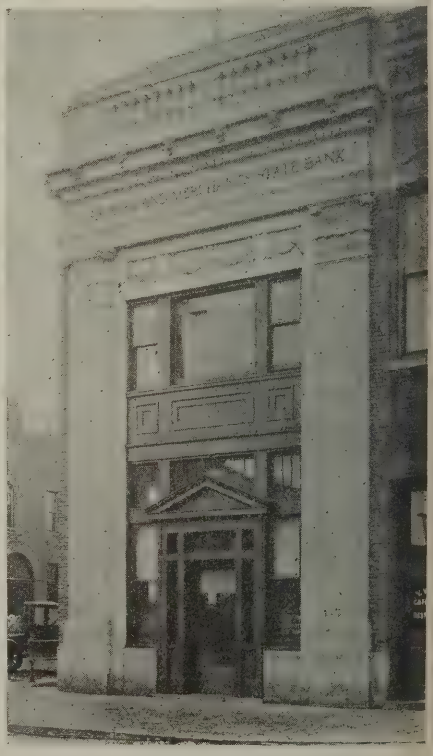


Farmers and Merchants Bank Plan

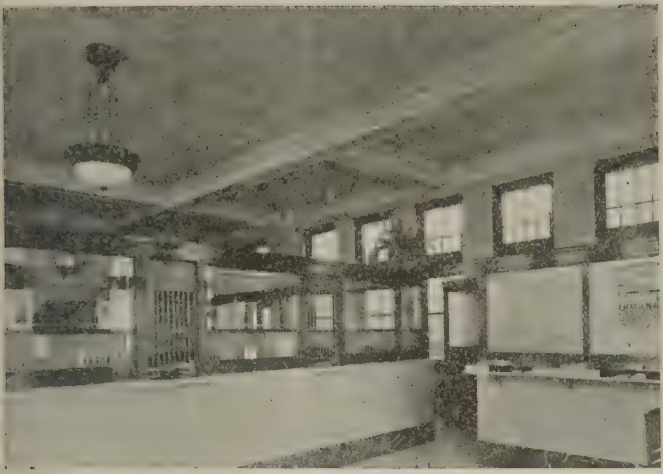
It is not the purpose of this article to discuss all of the factors entering into the design of bank buildings, but merely to illustrate how a successful firm of bank builders has succeeded in introducing the character of the banking business into the design of their buildings.

The First Guaranty Bank at Bismark, North Dakota, presents an excellent example of a bank building where the above features of design have been well carried out. The front of the building is faced with stone. Four large Corinthian columns rest upon solid stone piers, while at each side is a massive stone pilaster with a Corinthian cap. The sash and doorway are of dark metal, contrasting well with the white stone. A simple parapet wall crowns the building in an effective way.

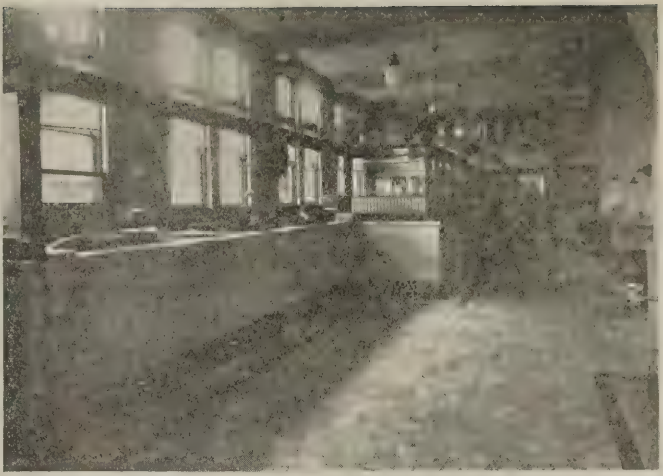
The interior walls and partitions are finished with a light marble to a height of about four feet and have a strip of darker marble running around the base. The upper walls and ceiling are plaster, decorated with



Farmers and Merchants State Bank, Austin, Minn.



Interior Mellen State Bank,
Showing Bars at Teller's Window



Interior Farmers and Merchants State Bank
Note sharp angular marble trim

a simple fresco border. Fluted pilasters spaced at equal intervals divide the walls into panels.

The upper half of the partitions are glass in a metal frame and the window at each teller's cage is guarded with a small barred gate.

Such a bank is well suited to a city of moderate size where the cost of frontage does not make it necessary to carry office floors above the bank proper.

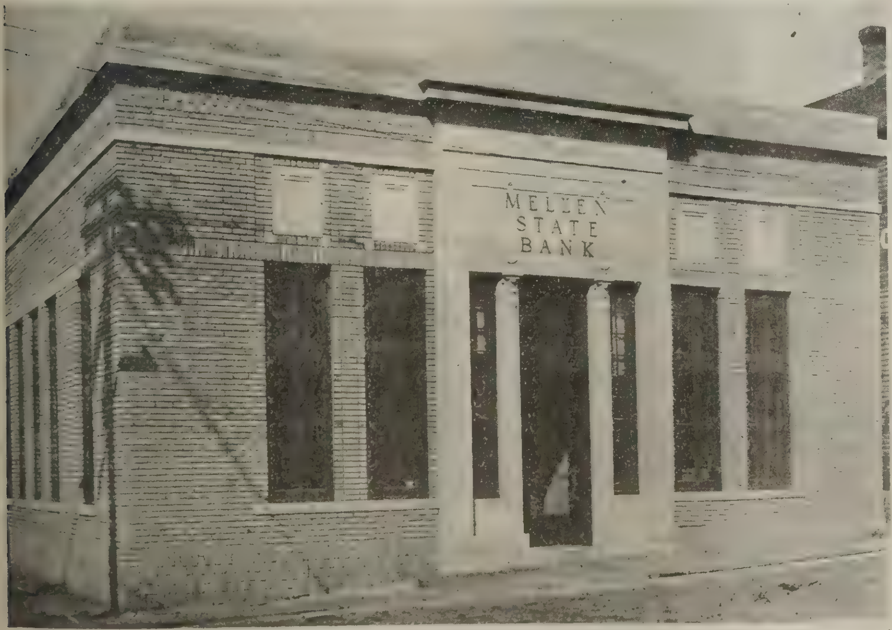
The Farmers and Merchants Bank, Austin, Minnesota, is located on a small corner frontage. Stonework figures prominently in the front of the building and massive fluted pilasters at each side of the doorway give an impressive appearance. Metal sash, doorway and trim and stone parapet wall give a pleasing appearance.

The plan is long and narrow, due to the narrow frontage. With the exception that the walls are not paneled, the interior is very much like the First Guaranty Bank described above.

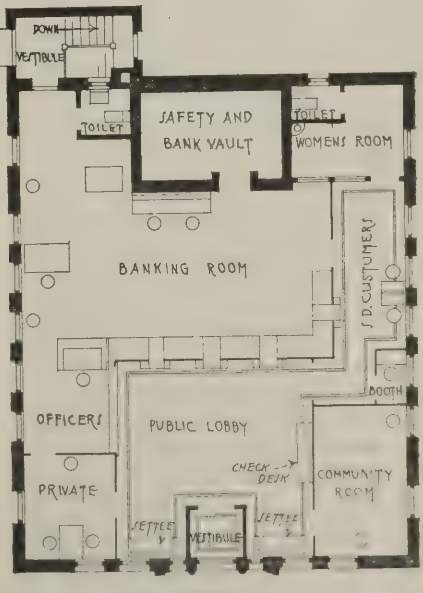
This is a good treatment for either a city or town bank where only a small corner frontage is available. Although facing the narrow way on the main street, it has all the lighting advantages that it would have if it faced the wider way on the side street.

Quite different from the foregoing buildings is the Mellen State Bank at Mellen, Wisconsin. The treatment here has been in face brick with stone trim. The metal work has been confined to window and door frames. The raked joints in the brickwork make it stand out in a way that is pleasing.

This bank is severely simple, both in the exterior and interior treatment, and is an excellent example of how well the bank in a small town can be done when it is handled by experts. In fact, all three examples are worthy of study as to exterior and interior treatment.



Mellen State Bank, Mellen, Wis.
A good example of small brick bank

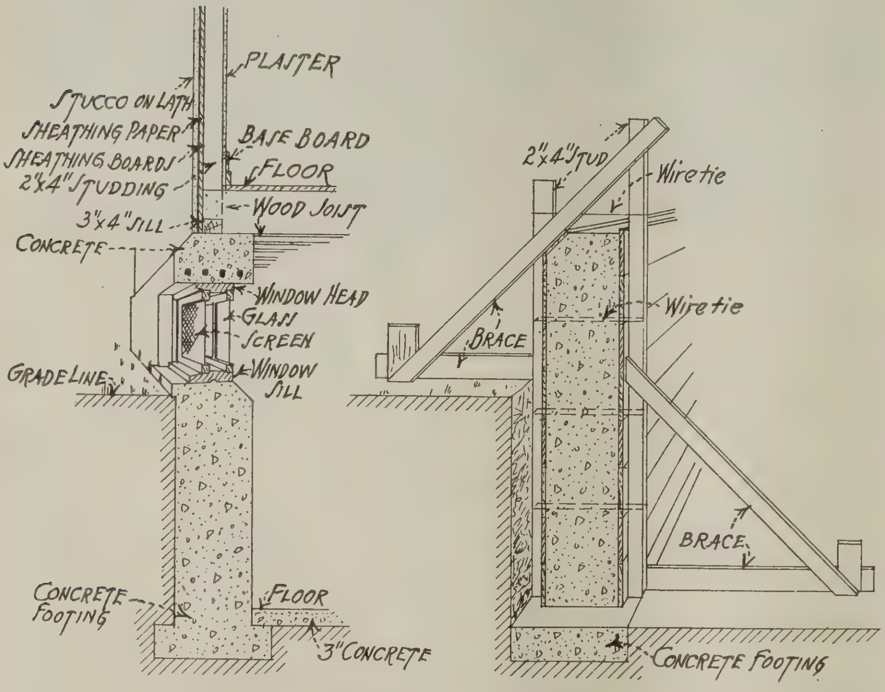


Plan
Mellen State Bank

Concrete Foundations For Small Houses

Footings, Economical Form Work and Proper Mix

THE sketch shows a typical detail for a concrete foundation or footing for light structures such as small houses. Concrete is probably the simplest for the footing construction for such work. The thickness must be sufficient to prevent the columns, if there are any, from punching through it and the spread at the base must be wide enough so that the bearing capacity of the soil is not exceeded.



Sectional Elevations Showing Concrete Foundations and Form Work

For small house work a 12-in. footing is generally sufficient to carry two stories. The bearing capacity of different kinds of soil is given in tons per sq. ft., in the accompanying table.

Concrete mixture for footing is generally in the proportion of 1:2½:5. For such a mixture 100 sq. ft. of a 12" wall will require 4.60 bbl. cement, 1.70 cu. yd. sand and 3.40 cu. ft. pebbles. The following table is useful in determining the amount of cement, sand and pebbles required for different thicknesses of wall, using a 1:2½:5 mixture:

MATERIALS REQUIRED PER 100 SQ. FT. WALL

Thickness Wall	Cement bbl.	Sand cu. yd.	Pebbles cu. yd.
6	2.30	0.85	1.70
8	3.08	1.13	2.26
10	3.85	1.41	2.82
12	4.60	1.70	3.40
15	5.76	2.12	4.24
18	6.90	2.55	5.10

For forms white pine, spruce and soft southern pines are the best. All lumber should be dressed, preferably on both sides, to give a uniform smooth face to the concrete. Where the footing will not show any lumber can be used that will hold wet concrete.

Forms may be stripped from the walls in twenty-four hours, but it generally is better to allow the concrete to set at least 48 hours before stripping. In the winter time or in cold weather the period of setting should be five days before the forms are stripped.

BEARING CAPACITY OF VARIOUS SOILS

	Tons per sq. ft.
Dry clay	6-8
Moderately dry clay	4-6
Soft clay	1-2
Gravel and coarse sand	8-10
Sand, dry, well packed	4-6
Sand, clean, dry	2-4

Should Industries Build Now?

AS the result of a nation-wide survey regarding the industrial building situation in the United States the Detroit Steel Products last week issued a symposium relative to the vital question, "Should industries build now?"

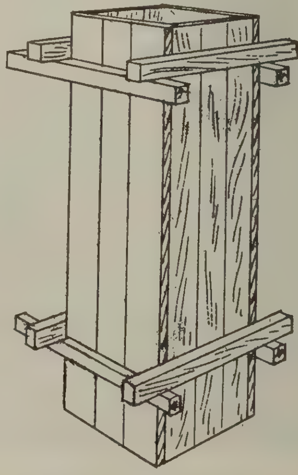
The consensus of opinion of 200 architects, engineers and contractors is summed up as follows:

"The United States as a whole is not overbuilt.

"Those whose business warrants expansion will make no mistake in building at once, for labor is plentiful and its efficiency is increasing, while material prices have dropped.

"Lower labor costs and possibly a slight further drop in material prices are expected by the building public and until some such movement is sighted the present buyers' strike is very apt to continue.

"Prices on building material will probably become stable at around 50 per cent. increase over 1913 prices, but complete stabilizing of the market is not apt to occur before late fall or early in 1922. The resumption of industrial building, therefore, is apt to be very gradual."



Form for Concrete Pier

From Cabinet Maker to Million Dollar Contractor

In an Exclusive Interview Ludolf M. Hansen Tells How He Has Built Up a Highly Prosperous Business From Nothing

LUDOLF M. HANSEN came direct to Green Bay, Wisconsin, from Denmark in 1896. He began local work as a cabinet worker in a furniture factory and later as a carpenter on construction enterprises. In 1904 he began contracting in a modest way, gradually increasing his operations until today there is not a portion of the city of Green Bay which does not contain a number of Hansen-built residences.

In 1916 the Ludolf M. Hansen Company was organized and the range of its construction efforts gradually widened to take in commercial and industrial buildings of various types. To do this, an organization was built up, consisting of construction engineers and architects.

From a construction and technical point of view, it is doubtful if there is another concern of its kind in the country today which has a closer knit and easier working staff of building experts at its command.

The consulting department has three technical men to meet and advise its clients. These men are graduate civil and construction engineers. The architectural and designing departments are conducted by men thoroughly trained and versed in their particular lines.

Builders Do Not Advertise Enough

In an interview with BUILDING AGE Mr. Hansen said: "I was always impressed with the idea that the contractor was the poorest advertiser in business today. He might do some excellent construction work, make some real records and have one of the finest organizations in existence, but seemed to feel that the world would find it without his effort."

Continuing, Mr. Hansen said: "My first work as a contractor was the construction of small cottages. My work was satisfactory and I was proud of it, but I wanted to build some of the finer homes that were projected around me. At the same time I did not want to confine my efforts entirely to homes. I wanted to be able to sell construction just like a department store sells commodities, and trimmed my sails accordingly.

LUDOLF M. HANSEN
President, Ludolf M. Hansen Company, Green Bay, Wisconsin

"Up to this time I had been busy with the saw, plane and hammer. I was personally on the job and matched my skill as a cabinet maker with that of my carpenter workmen. But I decided that I could never get beyond the mere carpenter stage unless I struck higher levels. To do this I would require competent foremen and superintendents. These men I promoted from my construction crews. I am proud today to say that most of these men are with me today and some of them are stockholders in my construction company.

Technical Knowledge Needed

"As the scope of my operations increased, it became evident that practical experience alone would not get me a maximum of results. I needed technical knowledge and secured it by hiring a construction engineer. Later I hired a second and finally a third. These men were graduates of technical schools and were further equipped with some excellent experience in actual construction work.

"I then secured the services of an advertising man and made a liberal appropriation for conducting an advertising campaign. This advertising campaign was started at a time when we had so much work that it would really have embarrassed us to have been offered any other large construction. I believed, however, that money spent for advertising, at this time, would in a way represent an insurance policy laid up against a time when we would have to solicit business instead of having business solicit us.

"A large letter 'H' in blue and white on an orange background, with the name of the firm and our slogan, 'Expert Building Service,' featured each and every piece of advertising put out. This advertising included sign boards wherever we were constructing a building, display ads in the newspapers of Green Bay and cities adjacent to Green Bay, circular letters, photographs and a booklet neatly arranged and with no expense spared in making it attractive.

"In 1920 I was able to realize my early dream of selling any type of

Four-Room House Designed and Built by the Ludolf M. Hansen Company

building service to any individual who might require it. My organization had been carefully departmentized and we advertised that building experts were prepared to meet any individual on any matter pertaining to construction and intelligently care for his or her requirements.

"We were not only prepared to design or construct buildings, but went into the intimate business affairs of a client. Our engineers ascertained just what each client's problems were, what the business conditions were in his particular line, how much money he had for construction or just what his difficulties were in raising the money required.

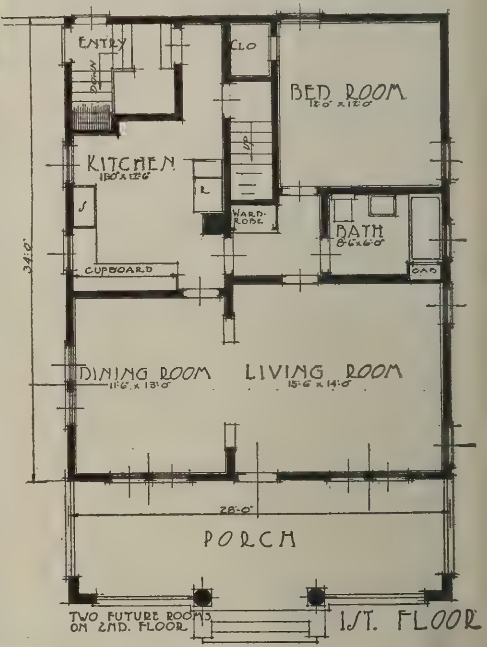
"We then advised him as to the material he might use to best advantage in this building, the maximum amount of construction he could safely venture upon and at the same time meet his needs and his finances, and even advised in many cases that he attempt no building at all, but make minor changes in his old structure that would serve him adequately.

"Buildings were appraised, fire losses adjusted, inspections made to ascertain fire and structural risks. Builders who had already decided upon the construction desired were shown just how and where expensive materials, or materials practically out of the market, could be left out of specifications and new materials, cheaper or more easily acquired, substituted.

"At the end of the year we found that this service department had fulfilled just the purpose for which it was organized. It provided an income sufficiently large to carry the expense of maintaining our high-salaried engineering staff and we had the services of these men for our construction work without being forced to charge this overhead entirely against the construction projects.

Boys Sent to School in Winter

"During the winter months, while

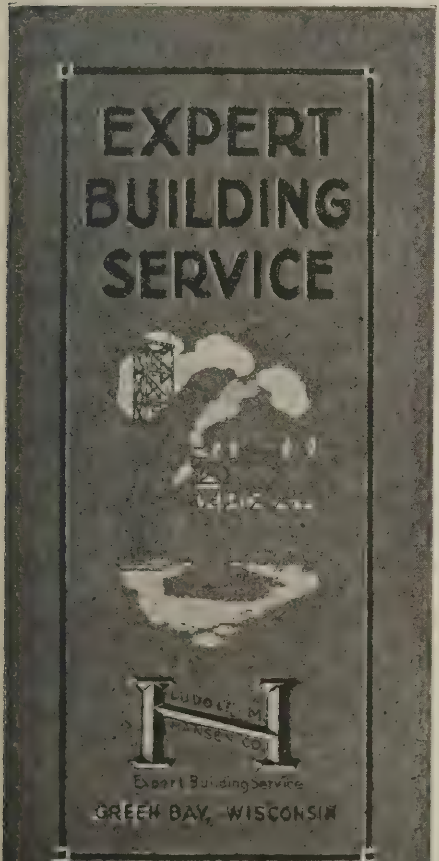


First Floor Plan

Plant of the Allouez Mineral Spring Company, Designed and Built by the Ludolf M. Hansen Company
Fireproof Construction Throughout

our season was more or less completed and new projects not sufficiently materialized to require real attention, we took some of the boys and sent them for a few months' graduate work at one of the universities. They came back to us with new ideas, new knowledge and added enthusiasm, and I am convinced that it is well worth following up in future years.

"Early in 1921 we added our last department. One of the best road and bridge engineers of the Middle West was available, and although many large concerns were out after him, we succeeded in persuading him to join our staff. This department has completed our organization and we entered the new year prepared to sell anything and everything in construction, from a cottage to a complete industrial plant or from a cement drive to a rural highway or concrete bridge.



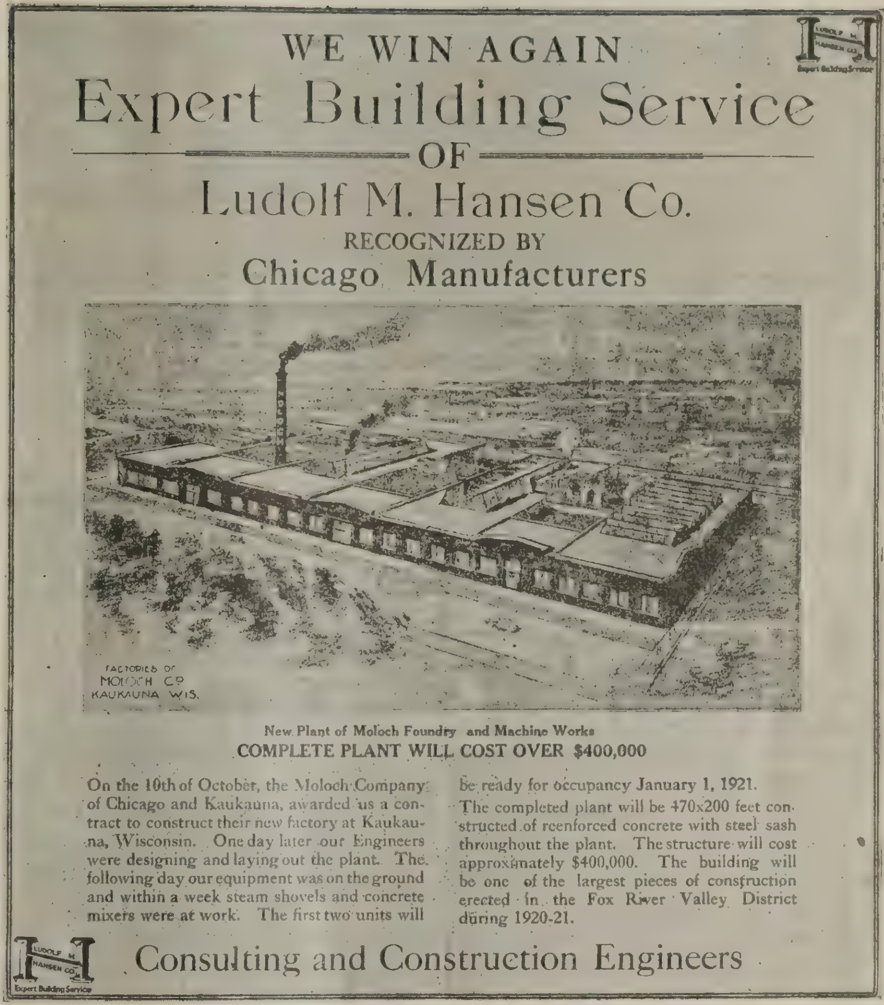
EXPERT BUILDING SERVICE

LUDOLF M. HANSEN CO.

Expert Building Service

GREEN BAY, WISCONSIN

Cover of Advertising Booklet which describes organization service and the methods of the Ludolf M. Hansen Company in an interesting and readable way



WE WIN AGAIN

Expert Building Service

OF

Ludolf M. Hansen Co.

RECOGNIZED BY

Chicago Manufacturers

FACTORIES OF
MOLOCH CO
KAUKAUNA WIS.

New Plant of Moloch Foundry and Machine Works

COMPLETE PLANT WILL COST OVER $400,000

On the 10th of October, the Moloch Company of Chicago and Kaukauna, awarded us a contract to construct their new factory at Kaukauna, Wisconsin. One day later our Engineers were designing and laying out the plant. The following day our equipment was on the ground and within a week steam shovels and concrete mixers were at work. The first two units will be ready for occupancy January 1, 1921. The completed plant will be 470x200 feet constructed of reenforced concrete with steel sash throughout the plant. The structure will cost approximately $400,000. The building will be one of the largest pieces of construction erected in the Fox River Valley District during 1920-21.

LUDOLF M. HANSEN CO. Expert Building Service

Consulting and Construction Engineers

Full Page Advertisements in Chicago "Tribune" Is But a Part of Publicity Work of the Ludolf M. Hansen Company

"Many contractors are asking us just how we have secured contracts enough to keep our machine busy for the greater portion of the present year. My answer has been to call their attention to the fact that the Ludolf M. Hansen Company is not a one-horse, but a two-horse affair, with a business organization as keen and efficient as is the construction organization.

"We knew that the money market, material adjustments and temporary business depression would cut in seriously on building. We found through our service department that man after man contemplating construction had decided to postpone building until some more opportune time, and every man in our complete organization was on his toes and primed for action before January first inventories and disrupted book profits had disappeared in thin air.

"Our advertising campaign had given us a wealth of inquiries and material to work on. Our service men had sounded our proposed projects and had located those that were sound and feasible for completion under existing conditions.

"Before bids were actually called for in a community, our advertising had made every individual in that community familiar with the big letter 'H' and the things it stood for. They knew that we were proud of our record of constructing buildings within estimates, as per specifications and on time.

"When the bids were called for, our engineers knew just where and how to locate materials. Our traffic men had looked up the rates and our equipment men were prepared to give us an assurance that the latest and best types of equipment would be

(Continued on page 30)

How to Do An Economical Brick Job

Kinks in Handling Materials and Men that Save Money and Increase Profits

By **LAWRENCE S. KEIR**

BRICKS should be kept damp enough so that they do not absorb the water from the mortar before the mason has a chance to bed them properly. They should also be dry enough so they will not slide and bulge in the wall. The ideal degree of dampness is such that the mason can spread enough mortar for from four to six bricks and have ample time to bed or lay that number before the mortar gets too dry to work properly. To make headway in brick laying provide good mortar. Nothing is saved by being too liberal with the sand. Cement costs money, but so does the mason's time.

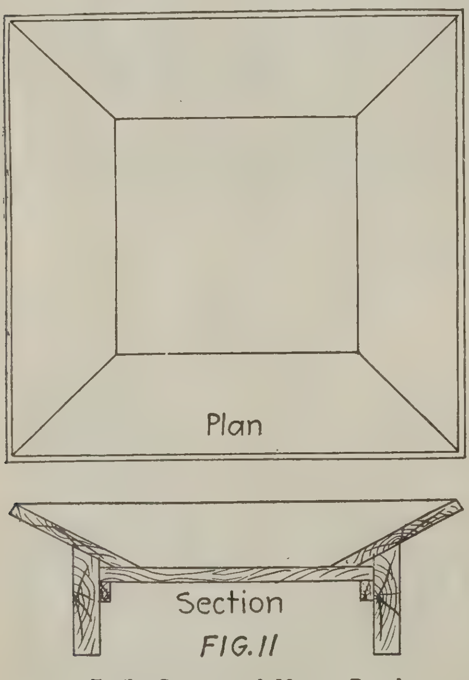


FIG. 11

Easily Constructed Mortar Board

I do not agree with many in the belief that a liberal use of lime is harmful in the general run of brickwork. My experience has proved just the opposite, because lime has the quality of working faster, while, at the same time, it makes a strong wall. I would take chances on a mortar with lime enough to work fast and smooth rather than with a cement mortar having little or no lime in it. The latter works short and does not adhere so well to the bricks unless they are laid one at a time and the bricks are very damp. There are occasions when only cement mortar should be used. For ordinary purposes, however, a mortar having even as much as half lime paste and half cement and with just enough sand to cause the the mortar to work free and clean on the trowel and yet have proper hang and body will give excellent results. The test of cutting through a brick wall laid with such a mortar will show the wall to be strong enough for all ordinary purposes.

A mortar man who knows his business is worth two masons on any job. A man who can keep your masons supplied with fresh mortar of the right consistency, properly tempered and of uniform quality is a prize. If you doubt it estimate the daily average output of your masons. Then keep your expert mortar man away from the job for a day and figure the amount of work done on that day. After the test you would not care to part with your mud mixer.

Don't be too arbitrary about the amount of sand used in the mortar. Sand varies. Some sands will make good mortar when mixed three to one, but many sands will require more cement or lime. If you have a good mortar man let him use a little of his own judgment in this matter and you will find that you will get better mortar.

Make things handy for the mortar man. A solid, tight mixing box, plenty of room. sand, cement and lime convenient, running water or a water barrel—these are some of the things that should be watched.

Keep the bricks stacked neatly. Where the best bricks are to be selected for the face of the wall let the helpers do the sorting and keep the two kinds of brick in separate piles. Helpers can sort brick more cheaply than the masons, and piling the bricks saves space and saves the mason a lot of bending over in the course of a day. The mortar board shown in Fig. 11 saves a lot of stooping.

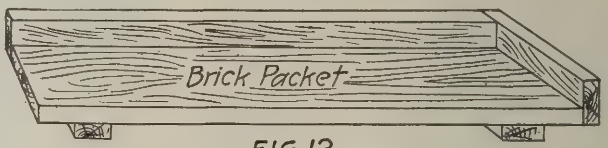


FIG. 12

A Brick Packet Is Quickly Made

Each mason should have a mortar board and the brick and mortar should be placed so that when the mason turns around to get them the mortar will be at his right and the bricks at his left. If he is left-handed the position of mortar and bricks will be reversed. Left-handed men are mighty handy to have around on a building if you make the right use of them, and there are always jobs that a left-handed man can get at much better than a right-handed man.

Considerable labor is eliminated if mortar and brick can be delivered by wheelbarrow. On some jobs the packet system of delivering bricks to the masons has been found to be an advantage. Packets are made of board with a cleat nailed to one end and in some cases to one edge also to keep the bricks from sliding off. A packet that is built quickly and cheaply is shown in Fig. 12 and will increase the speed of handling the brick.

Easy Surveying for the Builder

How to Make a Diagram of Your Lot As Required By the Building Department

By RUDOLPH P. SMITH

FOR the purpose of illustrating this article concretely we will assume that the building operations are located in a section that is governed by the New York City Building Code, which reads as follows:

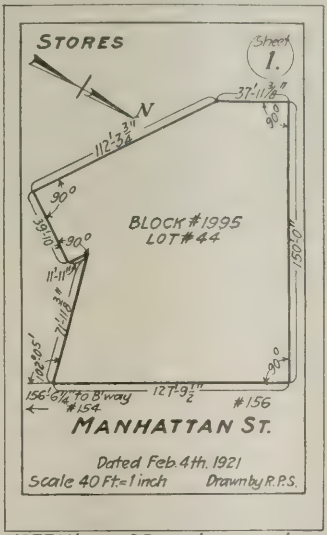
For Construction or Alteration

Before the construction or alteration of any building, wall or structure, or any part of either, or of any platform, staging or flooring to be used for standing or seating purposes and before the construction or alteration of the plumbing or drainage of any building, structure or premises is commenced, the owner or lessee or agent or either, or the architect or builder employed by such owner or lessee in connection with the proposed construction or alteration, shall submit to the superintendent of buildings a detailed statement in triplicate of the specifications, on appropriate blanks to be furnished to the applicants by the bureau of buildings, and such plans and structural detail drawings of the proposed work as the superintendent of buildings may require.

Such a statement constituting an application for a permit to contract or alter, shall be accompanied by a further statement in writing, sworn to before a notary public or commissioner of deeds, giving the full name and residence of each of the owners of said building or proposed building, structure or proposed structure, premises, wall, platform, staging or flooring, *and by a diagram of the lot or plot on which construction or alteration is made, showing the exact location of any proposed new construction and all existing buildings or structures that are to remain.*

The tenement house department requires a similar survey with the points of the compass clearly defined thereon. The labor department also requires a plan of this nature. These surveys may be made by a Civil Engineer, City Surveyor, or by the Architect or Builder himself. In New York City the plan must be made on tracing cloth, 8 1/2" x 14".

Map of Lot as plotted from Survey shown half the size 8½" x 14" as required by New York Building Department



NOTE: Name of Owner, Lessee and Architect should be given, also the size of Building and Yard if any. Sometimes part built on is shown hatched.

The first problem is the measurement of the horizontal distance between two points. If the plot is on a slope, this horizontal distance is less than the actual distance along the slope, but it is the horizontal distance, or projected distance, as it is called, that must be plotted on the map. This is measured by stretching a 100-ft. steel tape between the points, taking care that the tape line is held horizontal. For shorter distances a 50-ft. cloth tape or 6-ft. rule may be used.

When the distance is greater than the length of the tape it must be measured in two or more stages. This is done by holding one end on the first point, sighting between the two points to line in the other end of the tape and, after making sure that the tape is level, sticking a pin into the ground below the other end of the tape. This operation is repeated, using the pin as the starting point until the second point has been reached. When the free end of the tape is far above the ground, as on steep slopes, it is necessary to drop a plumb line from the end of the tape to the ground, in order to locate a point directly under the end of the tape. This is illustrated in Figure 1.

Right angles can be quickly and simply laid out without the use of a transit by remembering that if a triangle has sides equal to 3, 4 and 5 ft., respectively, or multiples of these figures, then the angle between the 3-ft. and 4-ft. sides is a right angle.

Angles like 30, 45 and 60 degrees can be laid out by splitting up a right angle into thirds or halves as the case may be.

For other angles an engineer's transit is necessary. Look up the maps that are on file in the records of the city. These maps will give the street lines. If the plot is not square with these street lines it will be necessary to measure the corner angle. This is done by setting the instrument over a stake located at "A" (Fig. 2), the corner of the plot.

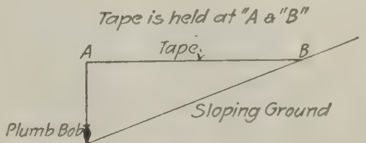


FIG. 1

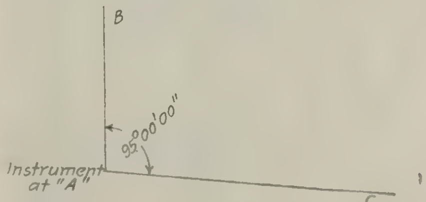


FIG. 2

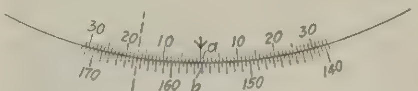


FIG. 3

Measuring Angles and Distances

Sight on "B," an adjacent corner, with the vernier of the instrument set at zero. Clamp the spindle and unclamp the vernier plates, turning the instrument to the point "C," the other adjacent corner. Clamp the plates and read the angle on the vernier.

The vernier of an instrument is represented in Fig. 3 and is graduated so that 29 spaces on the main scale, or limb, equal 30 spaces on the vernier. When the first line after zero on the vernier coincides with a line on the limb, it means that the zero of the vernier is just 1/30 of a space beyond the next lower mark on the main scale. If the main scale is divided into half-degrees, this 1/30 of a space is one minute. The reading of the vernier in Fig. 3 is 156 degrees and 17 minutes, because the zero mark of the vernier is just 17/30 of a space beyond the 156-degree mark on the main scale, since the 17th division on the vernier coincides with one of the marks on the main scale.

Knowing the horizontal length of the sides of the plot and the angle each side makes with the next one, it is a simple matter to make a map of the plot as shown in the figure at the head of this article. All the information given on this map is necessary and should be given on every map presented to the building department.

From Cabinet Maker To Contractor

(Continued from page 27)

available for each individual job. They sharpened their pencils and figured not by any rule of thumb nor haphazard conjecture, but with technical knowledge backed up by complete assurance that they had material, men and equipment to construct at the figures they quoted.

"Of course, we underbid our competitors. We knew we would when we submitted bids. We selected the jobs that were grouped properly for interchange of material, men and machinery, and got the jobs.

"Our road engineer selected the concrete road projects that would best fit in with the building projects and landed every job that he bid for. We have left the less desirable projects to our competitors and within a day following awarding of our first contract this spring, a steam shovel was on the ground and the dirt was flying.

"During the month of February a representative of the Moloch Foundry & Machine Works came to u stating that he had just bought out a lot of factory equipment from a Milwaukee company. He stated that he must have the machinery set up in suitable structure and in operation within a month.

"One engineer went to Milwaukee and looked over the machinery. Another went over the proposed site. Within forty-eight hours designs were out for a plant addition containing 5,000 square feet to be constructed of brick and concrete. The following day our concrete mixers were on the job In twenty days the building was delivered with the machinery in place and in operation. This was not a test job nor just a special piece of work. We believe that we can duplicate it at any time and under any condition. This was a quick job well done and we knew it. Our advertising man took advantage of it and came out with a full-page ad in the *Chicago Tribune* telling about it. We never miss an opportunity to advertise what we have done.

"Labor-saving equipment cuts down our costs. Rex concrete mixers are standard on our jobs. As for motor trucks, we use three different makes, namely, Traffic, Republic and International. Equipment such as this makes for speed on the job and enables us to hang up such records as we have just mentioned.

"With all of our work in progress this spring, we have left plenty of room for contingencies. There is a reserve sufficiently large to care for any desirable new piece of construction that may come to us, and we are still in a position to make any contractor entering our home field set a decidedly active pace if he beats us to it."

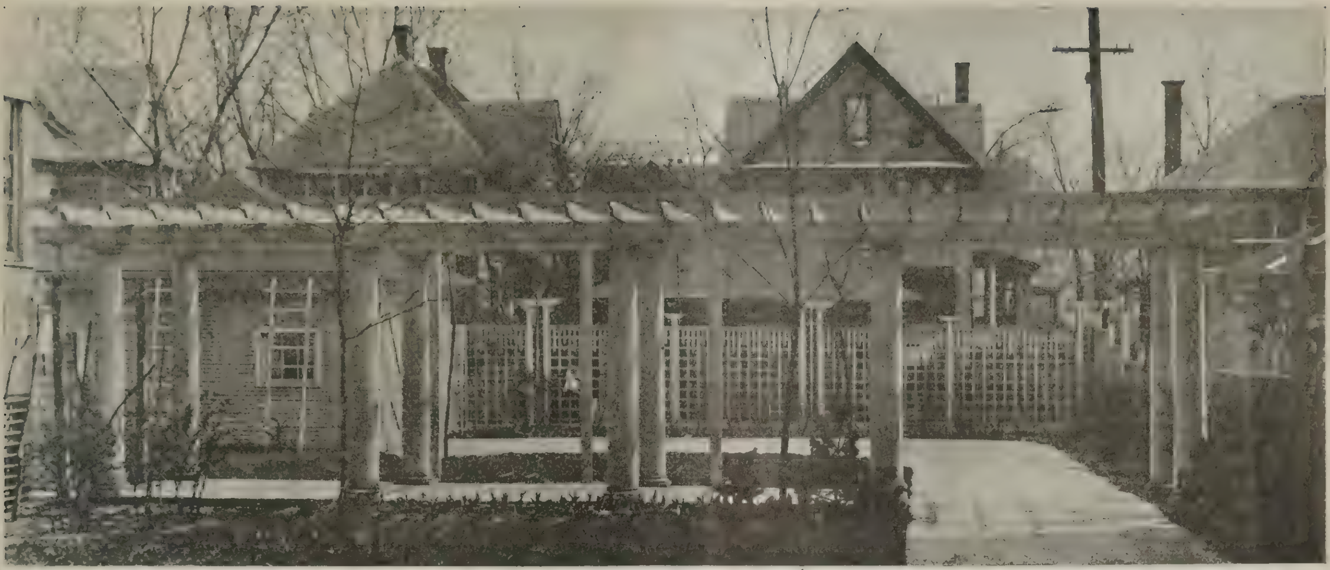
Home Financing Plans

ANOTHER interesting method of financing home construction has been brought about at Winona, Minn., by the Standard Lumber Company. This company has fathered a $100,000 stock company which will launch construction activities by the erection of ten substantial homes. The plan involves the cooperation of lumber dealer, banker, real estate man, and contractor.

The banks agreed to loan 50 per cent. of the actual cost of erection of each house, taking a first mortgage on the property. Then the prospective home owner pays down a minimum of 25 per cent. in cash. The remaining 25 per cent. is covered through the issuance of preferred stock in the "Winona Homes Company," paying interest of seven per cent. per annum. Ninety thousand dollars of this preferred stock and $10,000 of common stock will be issued as needed. The stockholders in the "Winona Homes Company" are the bankers who furnish the money, the firm which furnishes the lumber and mill work, the material man, the real estate dealer who furnishes the building lot, and lastly the contractor who puts up the houses. The contractor is paid on a fixed fee basis, ten per cent. of the estimated cost of each house. As the contractor is a substantial owner of stock in the "Winona Homes Company," it is to his direct personal interest to be efficient and economical in the construction work.

Standardization

ACCORDING to the Department of Commerce from 10 to 20% of the cost of building lies in lack of standardization, not only of methods and materials, but of building codes as well. Complete standardization of materials and codes is an Herculean task that should be accomplished. Already standardization of methods is enabling some up to date builders to do more business at less cost.



Backyard Pergola Forming a Covered Walk to the Garage

Garden Woodwork That Adds Beauty to the Grounds

Rightly Chosen Pergolas, Gates and Fences Dress Up a House and Increase Its Money Value

THE primary function of gates and fences is to keep out intruders and to keep in the wayward feet of kiddies imbued with the "wanderlust." Now any old kind of a gate that is strongly built may do this. The gate at the farmer's pasture is strong enough to keep his cattle from straying far from home and the barbed-wire fence is usually of sufficient protection to his property to speak well for its construction. But we are not interested just now in barbed-wire fences nor clumsy, swinging farm gates. We are interested in gates and fences and other garden woodwork that not only serve their real and necessary purpose, but are built with that artistic touch that makes you proud to have them on your property.

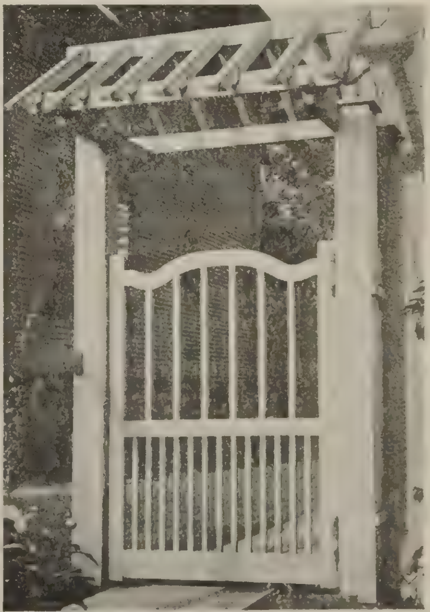
Pergola Adjoining a Kitchen Forms a Cosy Retreat for the Housewife

Value of the Artistic Touch

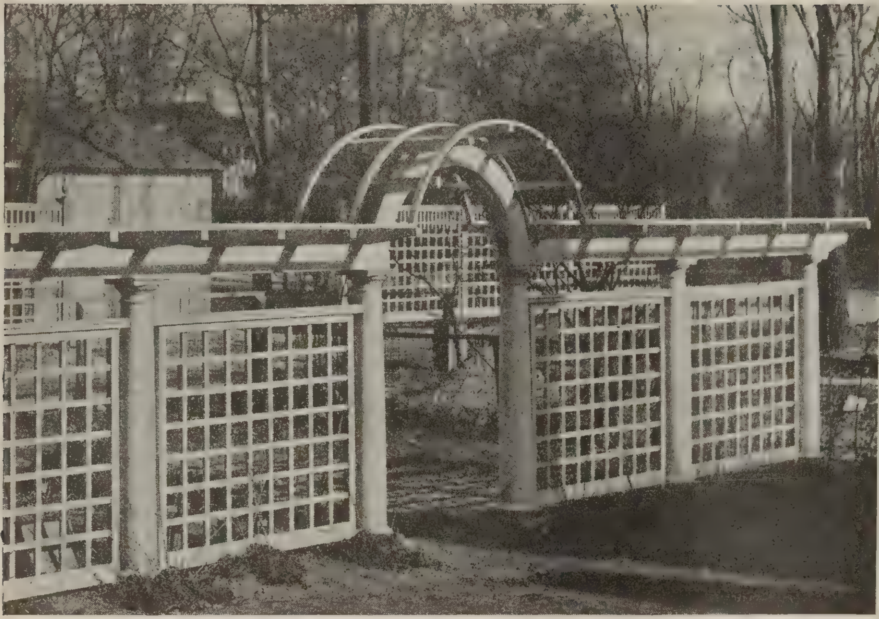
It is this artistic touch that converts the farm gate into the garden gate, the barbed-wire fence into the garden fence and the ugly shed into the vine-covered pergola. An otherwise uninteresting backyard is often transformed into a little garden spot if a little thought is given to building the fence just a little bit different from the ordinary and to placing a small pergola in an advantageous location. Such a backyard is shown in the picture at the head of this article. In this case the pergola and cement walk form a covered approach to the garage.

Another picture shows a pergola that adjoins the kitchen porch. In this picture the vines have already begun to twine themselves about the wooden posts and it will not be long before they will form a shady nook and cosy retreat for the housewife on a midsummer day.

A gate that is also a bit of artistic design is shown at the foot of page 31. The pergola effect forming a sort of covering for the gateway is



Artistic Gate—The Pergola Effect Above Has Not Improved the Appearance



Unusual Fence and Arched Gateway Before the Vines Have Begun to Grow

not all that could be desired. It is a bit topheavy, but the gate itself is a commendable bit of woodwork and would have looked far better alone.

A combination fence, gateway and trellis is another means of making the backyard attractive and livable. Such a device is shown in another picture illustrated here and it requires but little imagination to picture the beauty of this when the vines have covered it and arched their way over the entrance.

A simple covered gateway may often improve the appearance of a very commonplace fence. Another picture shows such a fence, very ordinary, but well built. The gateway is severely simple and consists of nothing but two wooden posts supporting a small gable. This miniature roof should be covered with the same shingles as the house proper, and painted or stained to suit.

Not all artistic gates and fences must be built of finished lumber. Large trees and heavy vines have a rustic atmosphere about them and an equally rustic fence and gate fit well under these conditions. In this case the walk should be board, stone or gravel, rather than cement.

Too Much Ornament Worse Than None

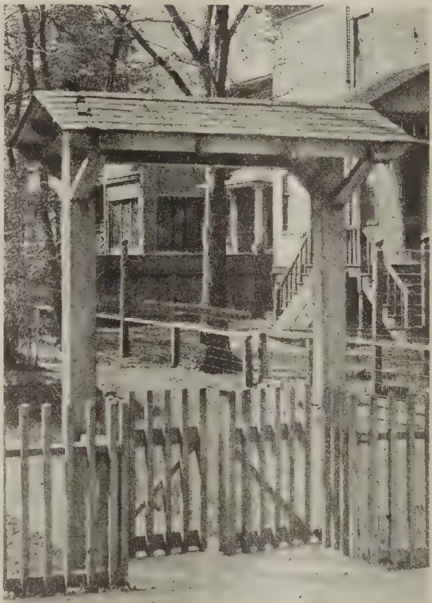
In fitting up the backyard with garden woodwork, bear in mind that too much ornament is worse than none at all. To clutter up the yard with a lot of arbors, pergolas, etc., only defeats your purpose and, instead of enhancing the beauty and value of the property, it becomes an eyesore. Usually the simple design is the best for such purposes. Do not try to put up a pergola in a yard that is only big enough for a garden seat. Use good judgment always.

It is not easy to say how much well-built and well-located features like these will increase the money value of the property. That they will increase it is without doubt, because they increase its beauty and attractiveness. But the amount will depend upon the cleverness of the builder in taking advantage of the natural beauty that is already in the property and in his ability to select such artificial features as will harmonize best with that natural beauty. They should at the same time be of a serviceable nature, thereby adding to the comfort and convenience of the owner.

New Tariff Schedule

A COMPARISON of the proposed Fordney Bill (which provides a new tariff schedule) with the present Underwood law is given below, insofar as it affects building.

Material	New	Old
Cement	5c per 100 lbs.	10%
Lime	10c per 100 lbs.	5%
Steel shapes	7/20c per lb.	10%
Sawed boards	15%	10%
Shingles	50c per M	free



Semi-Rustic Gate, Simple and Well Proportioned

Rustic Gate and Fence Amid Trees, Vines and Other Rustic Surroundings

How to Get Best Results Laying Floor and Other Tile

Kinds Sizes and Uses for Tiling. Precautions to Be Taken In Laying to Avoid Bad Effects of Wood Shrinkage and Settlement

ALTHOUGH the word "tile" is more or less loosely used to-day, it strictly refers to ceramic products which are used as a surface for floors, walls, ceilings, etc. Tiles are made from different kinds of clay which are treated to a refining and mixing process before they are eventually suitable for forming or pressing into tiles.

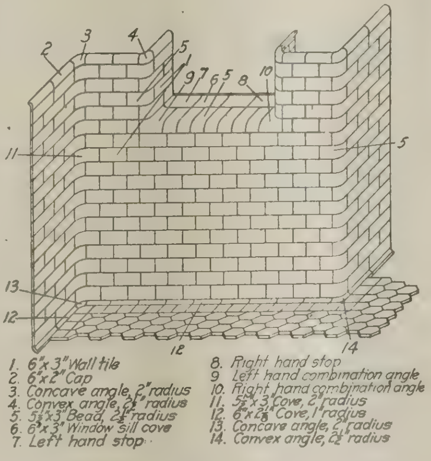
Unglazed tiles are vitrified in one firing, the colors being produced by proper selection of clays or by adding certain oxides. Some unglazed tiles cannot be completely vitrified. Unglazed tiles may, therefore, be vitreous, comprising white, silver gray, green, blue green, light blue, dark blue, pink and cream, or they may be semi-vitreous, comprising buff, salmon, light gray, dark gray, red, chocolate, black.

Square	Oblong
9 x 9	9 x 4½
6 x 6	9 x 3
4¼ x 4¼	6 x 4
3 x 3	6 x 3
2⅛ x 2⅛	6 x 2
1½ x 1½	6 x 1½
1 1/16x 1 1/16	6 x 1
	6 x ¾
Hexagon	6 x ½
6 x 5 3/16	4¼ x 2⅛
4¼ x 3 11/16	4¼ x 1 1/16
3 15/32x 3	3 x 1½
3 15/32x 3	3 x 1
2 15/16x 2	3 x ½
6 x 3	2⅛ x 1 1/16
4⅛ x 2⅛	1 1/16x 17/32
Triangle	Octagon
3	6 x 6
1 47/64	4¼x 4¼
1 5/32	3 x 3

The principal sizes and shapes of manufactured unglazed tiles are given above.

Inlaid and decorative tiles are mounted upon sheets of paper for ease and convenience in laying.

Glazed tiles require two firings. The product of the first firing is coated with the glazing liquid and a flux. It is then subjected to a high temperature which gives the glazed coating. Colored glazed tiles are known to the trade as "enamels." The range in colors is practically unlimited and they may be either plain or mottled. They come in the sizes and shapes given in column three.


2
3
4
5
1
9
7
6
5
8
10
11
5
13
12
12
14
1. 6"x 3" Wall tile
2. 6"x 2" Cap
3. Concave angle, 2" radius
4. Convex angle, 2½" radius
5. 5½"x 3" Bead, 2½" radius
6. 6"x 3" Window sill cove
7. Left hand stop
8. Right hand stop
9 Left hand combination angle
10. Right hand combination angle
11. 5½"x 3" Cove, 2" radius
12. 6"x 2⅛" Cove, 1" radius
13. Concave angle, 2" radius
14. Convex angle, 2½" radius

Some of the "Trimmers" Made for Glazed Wall Tile

Shaped tiles to match unglazed or glazed tiles are manufactured for use as bases, caps, corners, moldings, door and window trim, etc. White glazed wall tiles are graded and marketed in three grades, selected, standard and commercial. The standard grade is for the general run of work, such as barber shops, cafeterias, hotels, bathrooms of apartment houses and moderate dwellings. The selected tiles are those that have come from the kiln nearly perfect and are used in high class residential work, hospitals, etc. The commercial grade is used where slight manufacturing blemishes are not of great importance, as in manufacturing plants, basement toilets, shaft linings, etc.

Enamels, vitreous tiles and ceramic mosaic are sold in two grades, selected and commercial, while the semi-vitreous tiles are sold in the selected grade only.

Particular attention should be paid to the methods used to prevent shrinkage of woodwork in tiling bathrooms and in all frame construction. Interior partitions should be built over those on the floor below. If this is not possible, steel beams should be placed to support the partitions of the room to be tiled. In such cases, lighter weight joists may be used, thereby insuring better seasoning and less shrinkage.

Oblong	
9 x 6	4¼ x 2⅛
9 x 4½	3 x 1½
9 x 3	3 x 1
6 x 3	3 x ½
6 x 2	3 x ¼
6 x 1½	2⅛ x 1 1/16
6 x 1	
6 x ¾	
6 x ½	
Hexagon	Square
3 x 3 15/32	6 x 6
2 x 2 5/16	4¼ x 4¼
2 5/16x 2 21/32	3 x 3
	2⅛ x 2⅛
	1½ x 1½
	1 1/16 x 1 1/16
Octagon	¾ x ¾
3 x 3	½ x ½

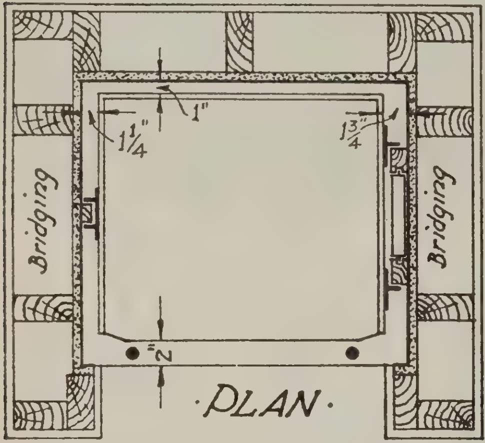
Free Entry for Maple Flooring

THE Board of United States General Appraisers handed down a decision yesterday sustaining a protest of C. J. Tower & Sons, of Buffalo, against the collector's assessment of duty, at the rate of 10 per cent. ad valorem under paragraph 169 of the tariff law, on certain maple flooring. Judge McClelland of the Customs Board finds that free entry should have been allowed.

How Dumbwaiters Should Be Installed

Method of Locating Guides in Various Types of Wells for Single-Face Dumbwaiter Enclosures

PROPER installation of dumbwaiters is essential to satisfactory operation. Manufacturing companies supplying such equipment generally furnish complete blueprints and specifications for such work and will supply experienced erecting men to install the job if desired. It is usually desirable to take advantage of such service as it may save time and money in the long run. For cases where it is not feasible to do this a brief summary of the main features of dumbwaiter installation will not be amiss.



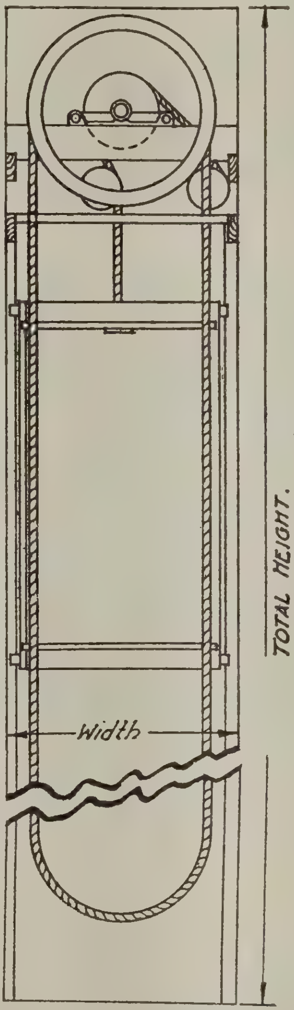
Showing Bridging and Guides in Plastered Well

In the first place dumbwaiters are designated as single face, double face, corner post operated at 3 sides or corner post opearted from one front, if they are,

- (a) operated from one face only
- (b) operated from two opposite faces
- (c) operated from three faces
- (d) operated from two adjacent faces.

In single-face installation where the well is sheathed with boards the guide runs are fastened direct to the sheathing with wood screws. Nails should never be used for this purpose. The inside dimension of the well should be about 3 in. larger than the outside dimensions of the car.

In a plastered well the vertical studs are almost never located exactly where required for the guides. It is advisable, therefore, to have horizontal bridging in both sides of the enclosure, located on 30-in centers. The guides are fastened to the bridging by long screws passing through the lath and plaster. When horizontal bridging has not been provided horizontal cleats may be put on the outside face of the plaster on 30-in. centers and the guides fastened to these cleats. Allowing one inch for the thickness of the cleats, the car should be 5 ins. less than the width between the plaster faces of the well. One objection to cleats is that they form shelves upon which dust collects. If it is possible to secure vertical cleating for the guides this objection is over overcome.

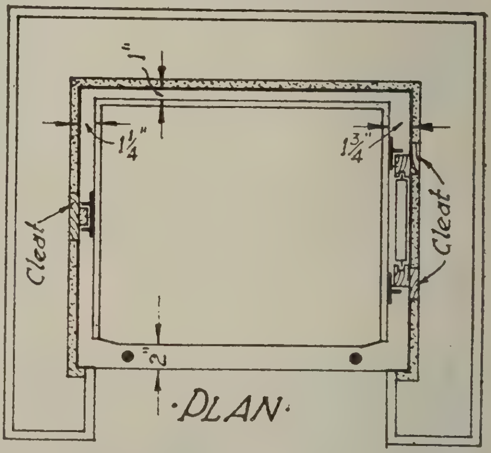


Vertical Section of Dumbwaiter and Shaft

In fireproof walls the cleating may be either horizontal or vertical. If the cleats have been put in before the well is plastered the plaster may be brought flush with the cleats.

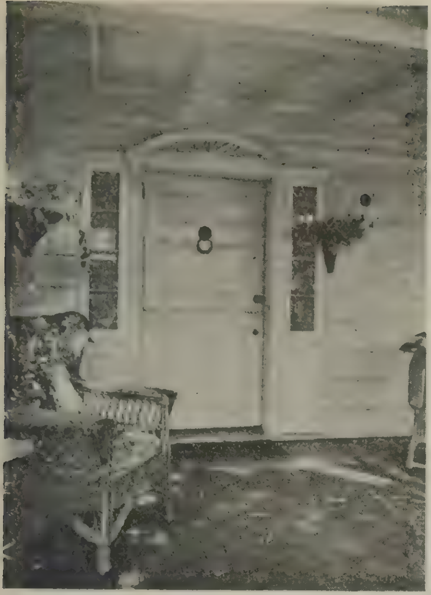
In double-face well the construction and arrangement is the same except that an extra inch is required between the fronts for the second hand-rope. The car must, therefore, be 4 inches less in depth than the well from front to front.

Doors from dumbwaiter shafts should be as wide as the car, 4 ft. high. The sill of the opening should be 2 ft. 6 ins. above the floor. This brings the top of the door 6 ft. 6 ins. above the floor and enables the operator to get a long pull on the rope.

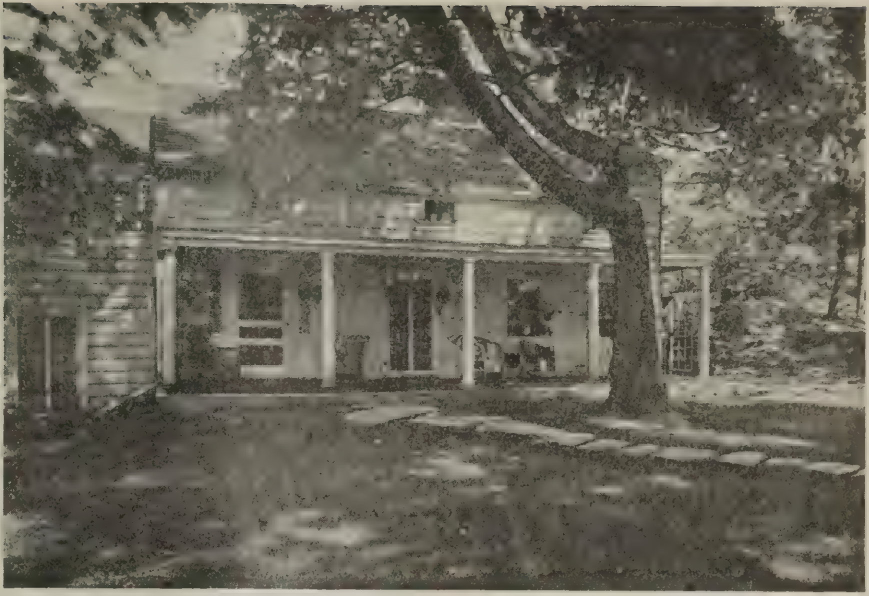


Showing Cleats and Guides in Fireproof Well

Machine space above the top door should be from 2 ft. to 3 ft. 6 ins., depending on the size and type of outfit. In all cases a door or panel should be provided at the top for access to the machine. At least one door opening must be provided sufficiently large to admit the car into the shaft when it is being installed.



Attractive Colonial Entrance Detail
House C. Seth Burton



House of C. Seth Burton, Scardale, N. Y.
J. H. Phillips, Architect

Remodeling Old Houses a Good Source of Business

Clever Ideas Turn Them Into Attractive Homes That Sell or Rent Quickly

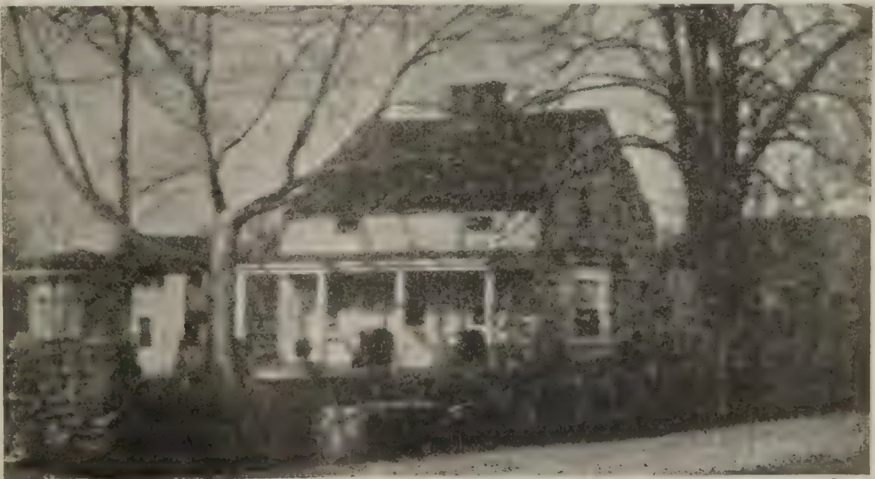
REMODELING and rejuvenating offers a field of activity for the builder that is not always appreciated and turned to good account.

In times when business is a bit slack and new construction is a little slow in coming along, the possibilities of dressing up an old building to look like new should not be neglected. This kind of business, however, is not apt to make its presence felt so quickly or so distinctly as in the case with new work: It depends largely upon the aggressiveness of the builder in going after it.

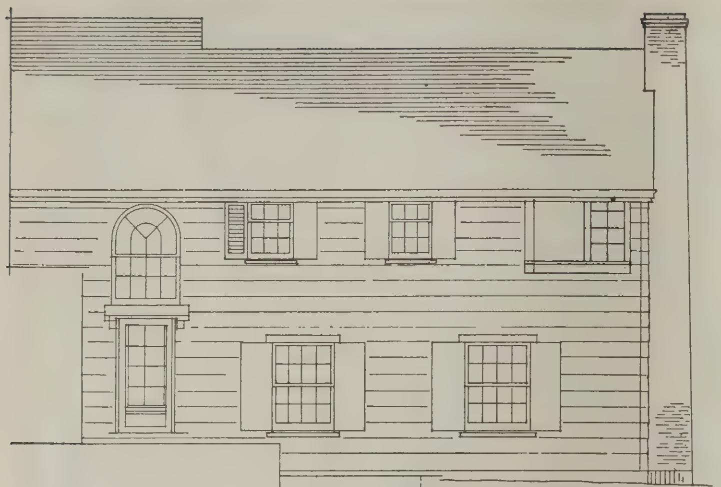
Owners are loath to admit that the time has come to spend money to remodel, even though they realize the desirability of it. But the builder can very often, by a little study of a time-worn building, think out a scheme of dressing up the exterior and interior that will increase its rent-producing value that an owner will have a hard time finding a good reason for not having the work done. Every dilapidated building in your town, Mr. Builder, is a business possibility for you. Give it a little thought. Perhaps you can convert it into a business actuality.

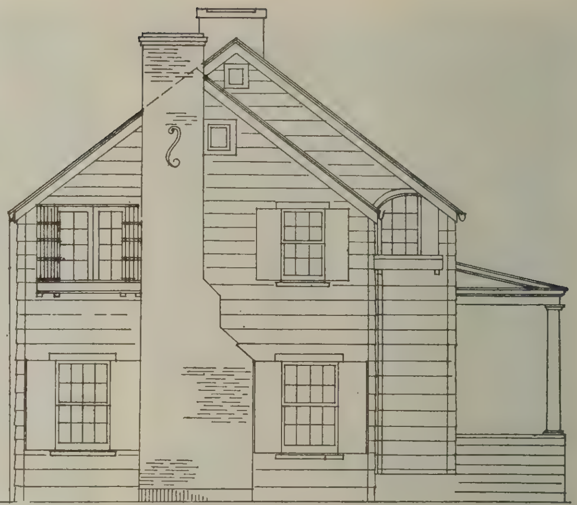
And when you are think about the buildings in town, do not forget the buildings in the country and country homes in particular. They are apt to be out-of-date. Perhaps a few touches here and there, a new porch, a slightly altered roof, a new stairway or fireplace will do the trick at small cost to the owner and good profit to yourself.

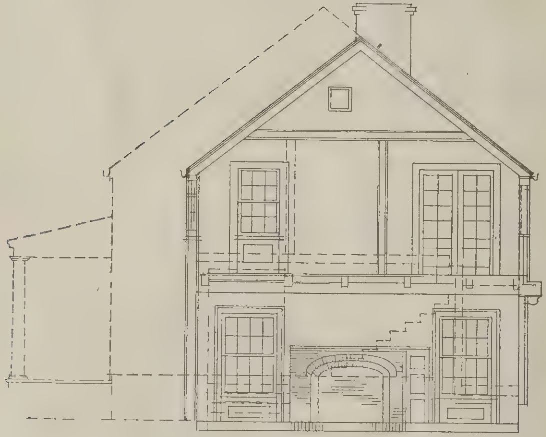
The house of C. Seth Burton, Scarsdale, is illustrated here and is an interesting example of the possibilities of the country house for remodeling work. In most houses of this type a touch of Colonial design and atmosphere adds much to the

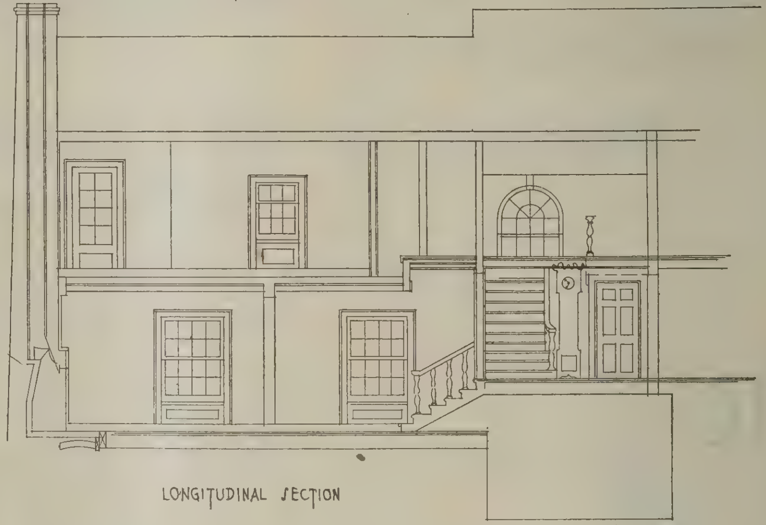


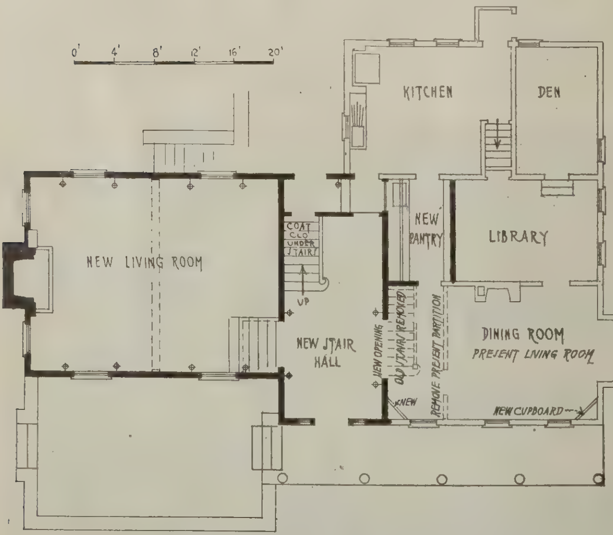
View of Old House Before Remodeling.
Note only four posts for the porch roof


NORTH ELEVATION

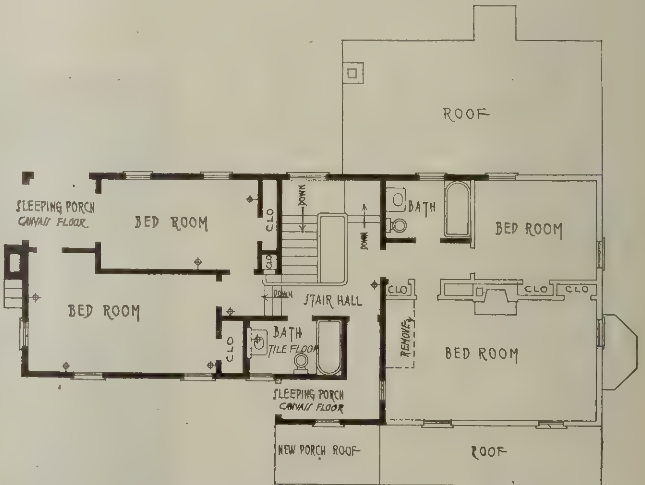

WEST ELEVATION


CROSS SECTION


LONGITUDINAL SECTION



First Floor Plan—Addition Shown in Black



Second Floor Plan—Providing Two More Bedrooms

Interior Living Room, Showing Brick Fireplace of Simple and Pleasing Design

beauty of the house as well as fitting well into the surrounding landscape. Such is the case here.

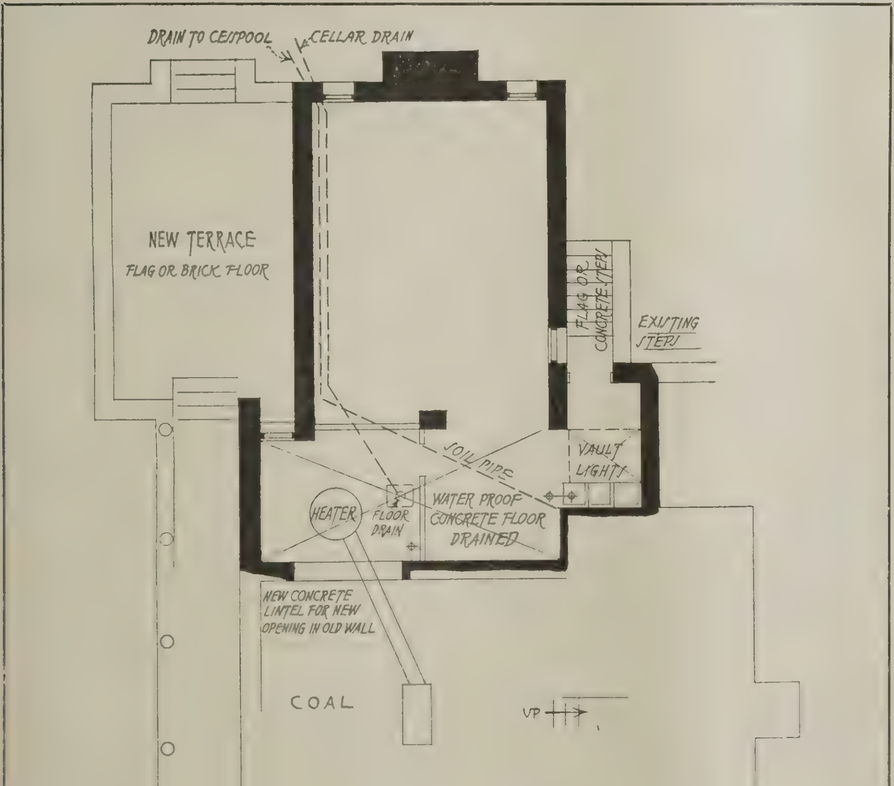
Originally the house extended up to the present new stair hall. In the remodeling the partition between the old living room and the old stair hall was torn out and the enlarged space was converted into the new dining room. The old entrance was allowed to remain but not as the main entrance. It was provided with French doors and served as an exit from the dining room to the porch.

A new stair hall and living room were then added at that end of the house and the porch extended to the end of the hall. One new post was thus added for the porch roof and the old posts were trimmed up and repaired. At this end of the porch was placed the new entrance, leading directly into the new hall. The front door is the split type permitting the upper half to be opened while the bottom half remains closed.

The floor of the new living room is about 3 feet below the floor of the old part of the house and is reached by a small flight of steps. This brings the floor line down to just a few inches above grade. At the far end of the living room is a large open fireplace equipped with new Covert throat and damper. The dark floor beams throughout the house give a cosy, country touch to the rooms.

The cellar was extended under the new addition and the heater located in the new part of the basement. Floor drains were installed and all the concrete work was waterproofed.

On the second floor the addition provided two additional bedrooms, two sleeping porches and bathroom.



Basement Floor Plan
Excavation was carried under the new addition

The Colonial Stairway
Combines well with the exposed joists

Legal Department

When Owner Replaces Defective Work

THE decision of the Appellate Division of the New York Supreme Court in the case of Cosden vs. E. E. Paul & Company, 187 New York Supplement, 48, is instructive on the question as to whether, when a contractor has failed to fully perform his contract, the owner is limited by the plans and specifications in the matter of replacement work. Plaintiff, the owner, sued to recover the expense of replacing defective work, and the opinion affirms judgment in his favor.

It appears that a terrace was defectively filled, and that, instead of following the plans and specifications in correcting the defect, the owner caused the flat arch of the terrace to be supported by a wall and a foundation. The contractor contended that this departure from the plans and specifications released him from liability, but the court said:

"If the cost was not greater than that of reconstruction in accord with the plans and specifications, the defendant cannot complain."

Certain walls were found to leak, and this was attributed to the contractor's failure to follow the specifications as to density of concrete to be used. The owner corrected the leaky condition by waterproofing the wall, at an expense less than would have been involved in reconstructing the walls. The court disposes of this phase of the case by saying:

"If this defect arose from failure to furnish concrete of proper density, the remedial steps of the plaintiff were not confined to substituting proper concrete; he could do anything else to effect the same purpose, and the defendant could not complain, unless the variation was more costly to it."

Minnesota's New Registration Law

DECLARING a purpose to safeguard life, health and property, the Minnesota legislature has enacted a law (Laws 1921, chapter 523) regulating the practice of architecture, professional engineering and land surveying. It was approved April 25, and governs these vocations after the lapse of six months. Summarized the provisions are as follows:

All readers are invited to ask any questions that will help them solve any legal difficulty that they may be in. Our legal adviser will answer direct by mail and give his opinion as to the correct procedure. Questions and answers of general interest to the trade will be published in these columns. All inquiries must be accompanied by the name and address of the correspondent so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only nitials or a nome de plume. Remember that this service is free to subscribers. Address Legal Department, Building Age, 920 Broadway, New York City.

Registration is required, with proof of qualifications. Residents of the state previously practicing need not register, but, without doing so, must not use the title "Registered Architect," "Registered Professional Engineer," or "Registered Land Surveyor." Nor need others engaged in "work of architectural or engineering character" register, provided that they do not hold themselves out as registered. Nor does the act apply to persons selected by public authority to perform public work.

The State Board of Registration is to consist of seven members appointed by the Governor. Three members are to be registered architects, three registered engineers and one registered surveyor. Rotating terms of office are provided. Members may be removed by the Governor for cause. High character of membership is sought by requiring appointees to have had at least ten years' practice with responsible charge of work for not less than five years.

Semi-annual meetings of the Board are required. Fees collected are to be used for maintaining Board.

Applicant for registration as architect or engineer must pay $25 for certificate. Fee for surveyor's certificate, $10. Twenty-five dollar fee will cover registration for two or all three of the professions covered by the act.

Certificates may issue to following classes.

1. To any person over 25 years of age, a citizen of the United States or Canada, or who has made declaration of his intention to become a citizen of the United States; who speaks and writes the English language; who is of good character and repute, and has been actively engaged for six or more years in architectural or engineering work, or engaged for four or more years in surveying work. The character of such work shall be equal to the standards fixed by the Board. Each year of teaching or of study satisfactorily completed, of architecture, engineering or surveying in a school of architecture or engineering of a standard recognized by the Board, shall be considered as equivalent to one year of such active engagement.

2. To any person who holds a like unexpired certificate of registration issued to him by proper authority in the District of Columbia, or in any state or territory of the United States, or in any province of Canada, in which the requirements for the registration of architects, engineers or land surveyors are equal to those fixed by the Board for this state.

Annual renewal of registration is required. Fee: $5 for architects and engineers, and $2 for surveyors, if certificate is obtained in December for following calendar year; $7 and $3 for belated renewals.

Registration certificates are revocable for fraud in obtaining certificate, or for gross negligence, incompetency or misconduct professionally. Procedure for hearing of charges before revocation is prescribed.

Authority is given for registrants to use seals on their plans, etc., showing that they are "Registered Architects," etc.

Violations of the act are punishable by a fine of from $50 to $500, or imprisonment for three months, or by both such fine and imprisonment.

The following exemptions are to be made in administering the law:

Offering to practice by a non-resident having no place of business in the state. Practice by non-residents having no place of business in the state and not practicing more than thirty days in any one calendar year in teh state; provided they are legally qualified in their own states. Practice by non-residents, or recently arrived residents, who have paid the required fee and applied for registration, but whose application has not yet been acted upon by the Board. Practice by non-resident as consulting associate if he has no office in the state and is qualified in his own jurisdiction. Practice as federal officer or employee.

A corporation or partnership may practice as such if those in responsible charge are registered or otherwise authorized to practice.

Contractor's Right to Extra Compensation

WHERE municipal authorities lawfully require work to be done on a building in excess of that specified in a contract for its erection, is the contractor entitled to extra compensation without having obtained a written order therefor from the architect?

This interesting question was passed upon by the Pennsylvania Supreme Court in the case of Cramp & Co. vs. Central Realty Co., 110 Atlantic Reporter, 763. It was decided that the right to compensation was not excluded by failure to obtain such order, and that not even the architect's decision that the compensation was not due could be treated as of weight, as against the municipal requirement for performance of the work.

In the same opinion the court holds that because the contract specified an assumption that "good bearing soil is to be found at a depth of 5 feet below the main basement and boiler room floor levels," the contractor was entitled to extra compensation for any excavation found to be necessary below that point. It is found that this specification in the contract brought the contract within an exception to the following stated general rule of law:

"It is conceded that, under the common-law rule, a contractor who undertakes an entire contract for erecting a building is presumed, in the absence of express provision to the contrary, to have assumed the risk of unforeseen contingencies arising during the course of the work, unless performance is rendered impossible by the act of God, the law, or the other party * * * Under this rule there is no implied warranty of the sufficiency of soil to support the building to be erected, and the contractor assumes the risk of a loss incident to such defectiveness."

A Materialman Did Not Waive His Right To a Lien

THE effect of a material-man giving a builder-owner a receipt for money as paid when no money had passed, and of the material-man reserving title to equipment sold, on his right to enforce a materialman's lien, was considered by the New Jersey Supreme Court in the case of Otis Elevator Co. vs. Stafford, 111 Atlantic Reporter, 695.

Defendant was both builder and owner of an apartment building at Atlantic City, and plaintiff installed elevators in it. Defendant became a bankrupt and when it was sought by the elevator company to enforce a lien to cover the amount due it, the trustees in bankruptcy contended, but unsuccessfully, that lien rights had been waived.

The first ground of defense lay on the fact that plaintiff's accountant, without the knowledge of any one else connected with plaintiff company, issued a receipt to defendant, reciting the receipt of $1,500 as cash paid, when, in fact, merely a note was received. This receipt was issued to enable defendant to collect money under mortgages, which otherwise would not be collectible. The court intimates that, as against the mortgages, this might have constituted a waiver of the right to a lien insofar as the $1,500 was concerned, but holds that, as against defendant himself, or his trustees in bankruptcy, it was open to the elevator company to show that nothing was actually paid.

The second ground of defense was that the right to a lien was waived by delivery of the elevators under a conditional sale contract, but the court holds that this defense, too, was unsound.

Time For Filing Lien

"WHERE labor or materials are furnished under separate building contracts, even though such contracts are between the same persons and relate to the same building or employment, the contracts cannot be tacked together so as to enlarge the time for filing a lien for what was done or furnished under either," holds the California District Court of Appeal in the case of Fly vs. Cline, 193 Pacific Reporter, 615. "The claim of lien must be filed for what was done or furnished under each contract within the statutory period after its completion."

The Builder as a Manufacturer

THE New York statutes make certain tax exemptions in favor of local "manufacturing" corporations. Is this law to be read as extending its benefits to a construction company engaged in erecting concrete buildings? This question was propounded to the Appellate Division of the New York Supreme Court and decided in the negative in the late case of People vs. Cantor, 186 New York Supplement, 890.

The court cites a decision of the United States Supreme Court in which it was held such construction work consisted in "manufacturing," within the meaning of a provision of the Bankruptcy Act that a corporation engaged principally in manufacturing may be adjudged an involuntary bankrupt. The New York court distinguishes that decision as an authority, on the ground that the various provisions of the tax law under consideration manifested an intention on the part of the legislature to limit the meaning of "manufacturing" to the production of articles of personal property. This observation is also made:

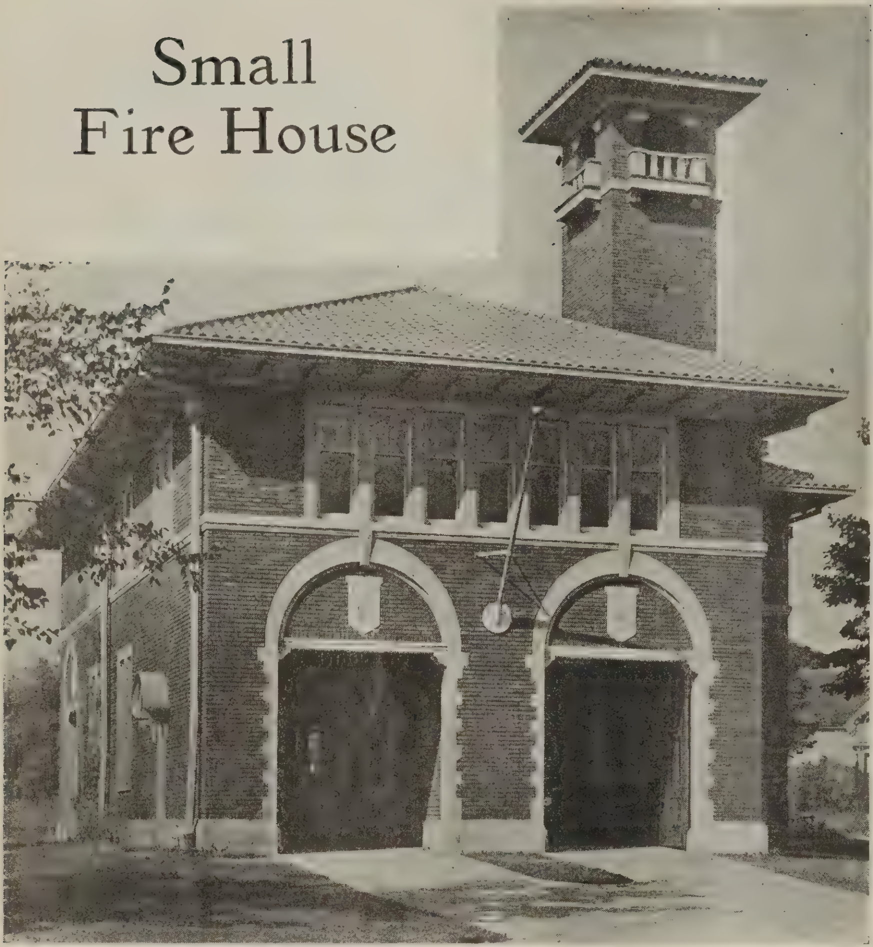
"Assuming that the construction of concrete buildings may be technically considered as a manufacturing operation, it nevertheless is a fact that it is an operation which resulted in producing real property, and not merchandise, which latter is personal property, movable and vendible as such. A concrete construction is an immovable mass affixed to the realty and a part thereof. Although the construction of concrete buildings may be an operation of manufacture, it is also a building operation. It by no means follows, however, because the appellant may be a manufacturing corporation under the Bankruptcy Act, that it is such within the meaning of the Tax Law of this state."

Bidder's Right To Withdraw Proposal Before Acceptance

A DECISION of the South Dakota Supreme Court recognizes the right of a builder to withdraw a bid and accompanying check any time before acceptance, although after opening of the bids. In the case before the court—Gray Construction Co. vs City of Sioux Falls, 179 Northwestern Reporter, 497—it appeared that the city advertised for bids for the construction of a fire station and library building. Bidders were required to furnish cashiers' checks as forfeits on failure to enter into a contract in case of acceptance of their bids. On opening of the proposals, including one filed by plaintiff, an award was made to a bidder other than plaintiff. Plaintiff afterwards demanded return of its check, which demand was refused. The successful bidder declined to enter into a contract and his deposit was forfeited. The city notified plaintiff that its bid was accepted. Plaintiff declined to enter into a contract, whereupon the city cashed plaintiff's check. Suit was then brought to recover the amount. Holding that plaintiff is entitled to recover, the court says:

"We do not deem it necessary to determine the contention of appellant [plaintiff] that the acceptance of another's bid was a rejection of its bid. Neither do we deem it necessary to determine whether or not, if appellant had allowed its deposit to remain with respondent [defendant], and in no manner had indicated its intention to withdraw its offer as expressed in its bid, such bid would be held to be a continuing offer, and subject to acceptance at respondent's election. We are clear that, there being no statute or ordinance otherwise providing, when appellant demanded the return of its cashier's check, it exercised an absolute right, which it possessed at all times, to withdraw the offer contained in its bid. Appellant withdrew its offer when it demanded the return of its check. Being absolutely entitled to return of the check upon demand any time before its offer had been accepted, respondent became liable to it when it converted such check to its own use and benefit."

Small Fire House



Fire Station, West Lafayette, Indiana
Chas. W. Nicol, Architect

THE fire station illustrated here provides for two motor-driven trucks, auxiliary apparatus and quarters for the chief and the men. The exterior is face brick with stone trim and the roof is tile. The tower shown in the picture is for handling the hose and its treatment by the architect lends an altogether distinctive air to the entire building.

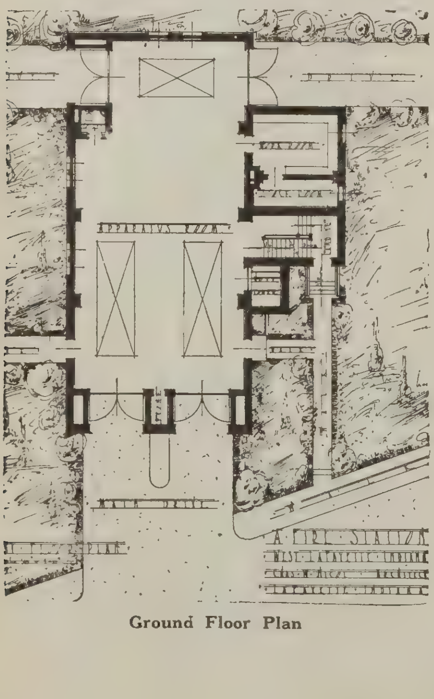
The ground floor is taken up by the apparatus, which is motor driven. Ample provision is made for a work room and a stock room for repair parts, etc. There is also a small toilet on this floor. In designing fire stations it is well to remember that the space required by different types of apparatus are about as follows:

Fire Engines,	each	8 x 24 ft.
Hose Carts,	”	8 x 24 ft.
Ladder Wagons,	”	8 x 55 ft.
Chief's Wagon,	”	8 x 20 ft.

Where horse equipment is used the dimensions are approximately the same.

The second floor of the West Lafayette Fire Station is given over to the Chief's room and vault, the main dormitory, the lounging room, the toilets, bath and drying rooms. There are the usual poles for quick descent to the ground floor when responding to calls.

In designing stations for horse-drawn equipment provision must be made for individual horse stalls alongside the apparatus. Feed storage is generally on the second floor. Harness and bedding rooms are on the first floor. A manure pit is provided outside at the rear.

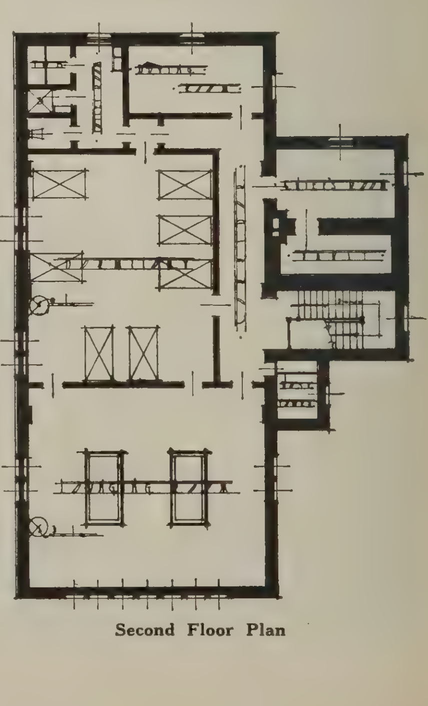


Ground Floor Plan

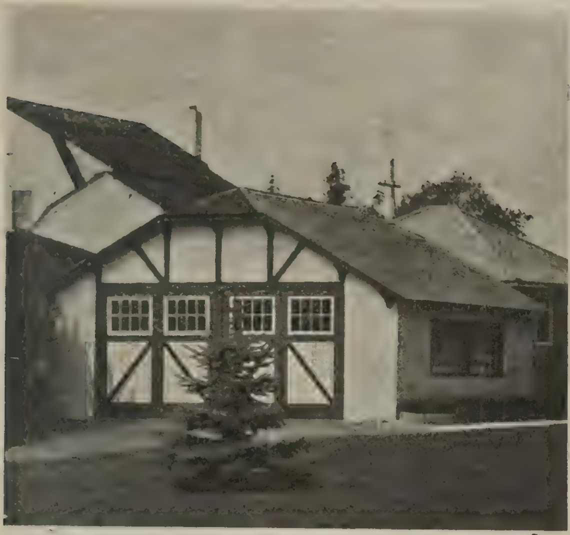
When to Heat Wood Before Gluing

UNIFORM high strength in joints of large size may be secured by heating the wood in a hot box for ten or fifteen minutes at 120 to 130 degrees Fahrenheit just before glueing. The heat from the wood prevents the glue from chilling and keeps it liquid until pressure is applied.

It should be remembered that heating the wood retards the setting of the glue to some extent. In heavy woods, from which the heat escapes slowly, this retarding effect is more marked than in lighter woods. In all species glued cold at the laboratory the time under pressure required to develop full joint strength was less than eight hours. When heated wood was used, at least ten hours were required to develop full joint strength in mahogany, and more than twelve hours in red oak and maple.

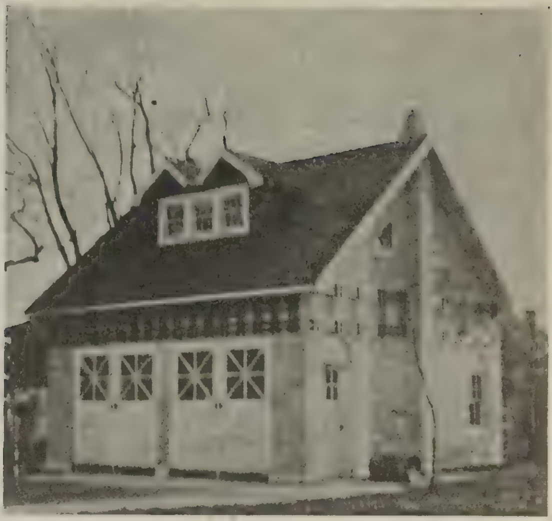


Second Floor Plan



Left

Garage of Henry Lo, Floral Park, Long Island. Jacob Gescheidt & Co., architects and builders.



Right

Garage of Robert W. Page, Glen Ridge, N. J. Frank Nies, architect.

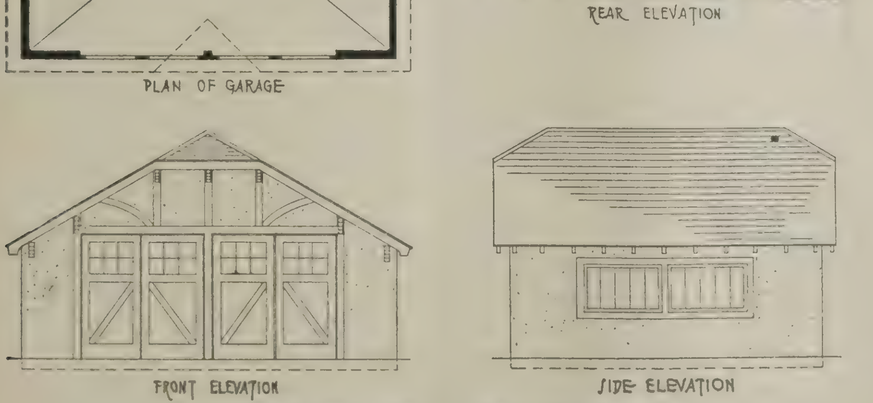
Garages for the Small Home

Layout and Construction of Good Designs That May Be Economically Built

THE extended use of the automobile by all classes has made the private garage just as necessary to the new house as the sun porch. In fact, the majority of the houses that are built today and even speculative houses have the added attraction of a garage, or, if not, have a plot of ground of sufficient size to allow for a garage and small driveway at some future time.

Naturally, it is better and more economical to build this necessary adjunct to the house at the same time that the house is building. The builder has all his materials and men right on the job and can do it at much less cost than if he has to figure on it as a separate proposition.

The architecture of the private garage generally follows very closely that of the parent building, the house.



PLAN OF GARAGE

REAR ELEVATION

FRONT ELEVATION

SIDE ELEVATION

**Plan and Elevations Garage at Floral Park, Long Island
Jacob Gescheidt & Co., Architects and Builders**

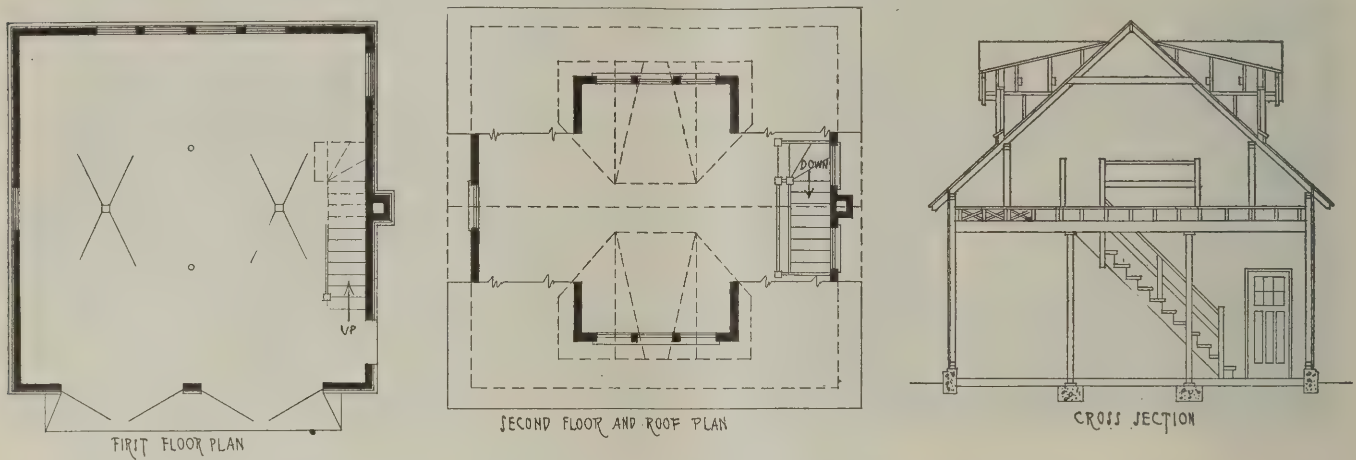
A two-story, two-car garage at Glen Ridge, New Jersey, is shown above. This garage was designed by Frank Nies, Architect, for Robert W. Page, President of the Marbleoid Company. The rough stucco exterior with white trim gives an unusually attractive appearance, while the little twin dormers lend a finishing touch to the otherwise simple gable roof.

The double swinging doors give an entrance that is 7 ft. 6 ins. wide by 8 ft. high. Inside the garage the width between the finished walls is twenty-one feet. The depth is also twenty-one feet. The height from the finished concrete floor to the under side of the 4 x 8 girders is about 9 ft. The floor is sloped to drain toward the center of each car space.

Stairs lead to the second story, which serves as chauffer's quarters. The floor here is ⅞-inch pine flooring. Both floors are lighted by electricity.

At Floral Park, Long Island, there is a rather interesting one-story, two-car garage, also of stucco exterior, designed by Jacob Gescheidt & Company, Architects and Builders. The plan of this building is 24 ft. wide by 20 ft. deep, outside dimensions. The doors are double and swinging and provide an entrance 8 ft. wide.

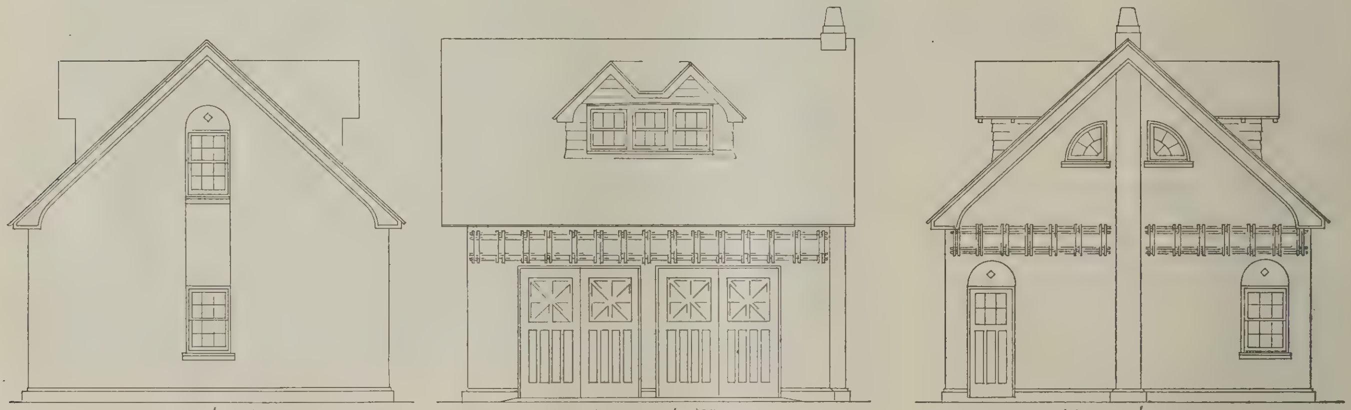
In this case the stucco exterior is smooth to correspond to the house itself and the trim is dark. The design differs further from the first garage in that the floor slopes to the center of the garage and the drainage is to that point instead of to the center of the car space. The space under the car is then always dry.



FIRST FLOOR PLAN

SECOND FLOOR AND ROOF PLAN

CROSS SECTION



SIDE ELEVATION

FRONT ELEVATION

SIDE ELEVATION

Plans and Elevations Garage of Robert W. Page, Glen Ridge, N. J.
Frank Nies, Architect

Insulating the Heating System Increases Value of House

WHEN a house is heated through a central heating system, whether by a hot-air furnace, hot water or steam, there is usually a great amount of heat radiated in the basement. Not only does the basement become unnecessarily warm, but this superfluous heat is deflected from the house proper where it is needed.

This trouble may be avoided by covering the furnace or boiler and all heat conveying pipes with asbestos paper. At least two thicknesses are necessary to make any appreciable difference; three are just that much better. Furnace men will do the work by contract, but every builder or contractor who has the time can do it as well. The asbestos paper comes in rolls a yard wide and can be purchased by the yard at something under 20 cents a yard. A powdered glue paste, which is ready for use as soon as water has been added to it, should also be bought. The asbestos paper is cut to fit the surface to be covered; it is then spread with paste and applied to the furnace or pipes. When one covering of asbestos is dry, another should be put on top of it.

Business Outlook Better

WHILE the business situation presents varying degrees of unevenness, says the *Annalist,* there is reason for congratulation that progress is being made toward stability, and once business has completely readjusted itself to the new condition the foundation will have been provided for a degree of prosperity which, while it may not be buoyant, as contrasted with that built on the false basis of inflation, will probably be more lasting and far removed from the gray outlook which was pictured several months ago.

Everywhere there are indications of a trend toward stability.

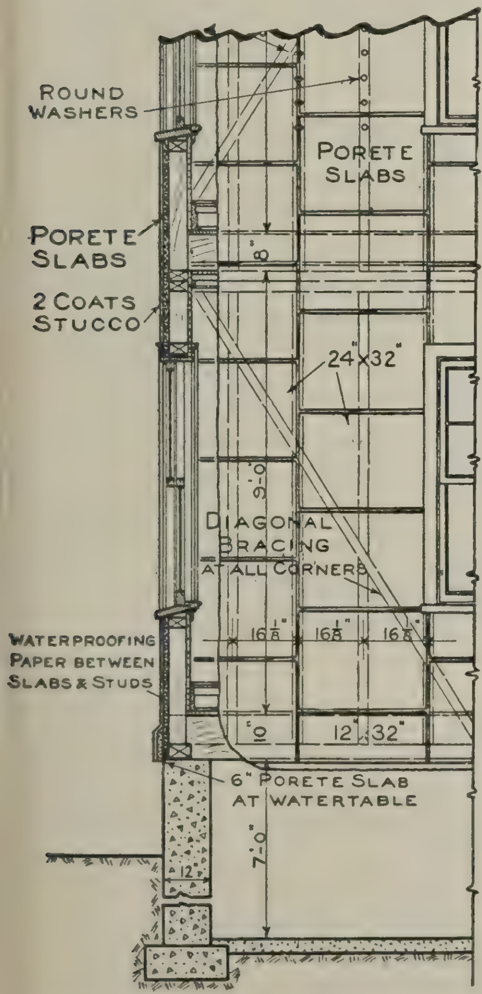
Porous Concrete as a Stucco Base

Lightweight Porous Cement Slabs Used in Small Stucco House Construction

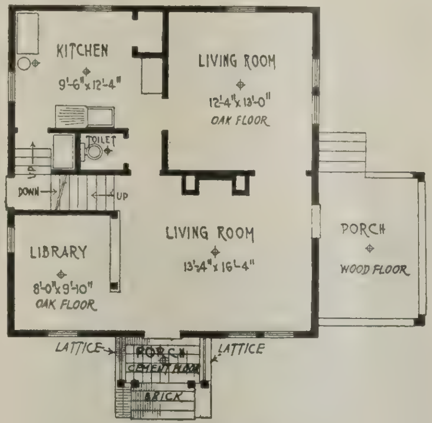
House at Belleville, N. J.
Stucco on Porous Concrete Construction

THE house of Dr. J. Ehrlich, Belleville, N. J., is an example of a dwelling where porous concrete slabs have been used as a base for exterior stucco work. The house is a seven-room dwelling with a square ground plan.

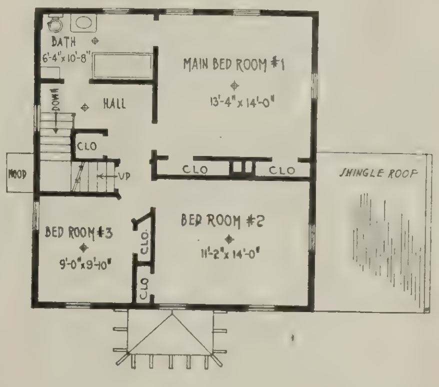
The roof happens to be of concrete tile laid on open 1x2 strips nailed across the rafters with no sheathing boards or paper underneath.



Sectional Elevation
Showing method of cross bracing and fastening porous concrete slabs



Ground Floor Plan



Second Floor Plan

The walls of the building are sheathed with porous concrete slabs 24"x32"x1" thick. These slabs are reinforced with 2" galvanized wire netting and are nailed to the studs, set at 16" centers forming a base for stucco. As no sheathing boards are used with this structure, it is necessary that all the corners of the building in each story be well braced with diagonal studs which go thru the whole story. Over the finished frame work a heavy, waterproof building paper is applied before the slabs are nailed to the studs. A special heavy galvanized, oval-dished washer is used under the nail heads. This washer, when driven down tight, bites into the cement structure of the slabs and forms a metallic connection between the adjoining slabs. Under the heads of the nails which are driven near the center of the slabs, small galvanized round washers are used. The slabs thus nailed down, hold tightly and give some bracing in themselves to the frame structure. All the joints between the slabs are left open not less than ¼". A number of half slabs are used to break the joints vertically.

The necessary cutting of the slabs around the windows and door openings is done with a chisel or hatchet, or by scratching with a sharp chisel on each side, and breaking the slab over the corner edge of a stud and with a pair of narrow wire cutters, cuttings the wire netting.

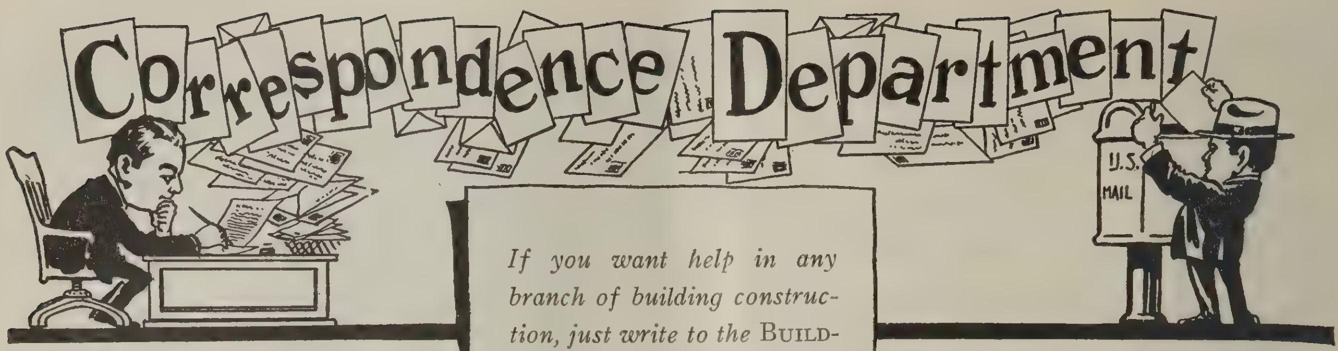
These slabs were also used underneath the roof cornice, which was designed by the architect to receive the full 32" wide slab.

The porch was completely sheathed

(*Continued on page* 49)

---

*It is not considered good practice to carry stucco work to the ground.—Editor.



If you want help in any branch of building construction, just write to the Building Age *Correspondence Department. We will be glad to answer all your questions without charge.*

All readers are invited to discuss the questions and answers published.

JOINING NEW CONCRETE TO OLD

From T. J. F., Los Angeles, Calif.—Please tell me through the columns of Building Age what you consider a good method for joining new concrete work up to an old job.

Answer—New and old concrete can be joined only with great difficulty, and the strength of such a connection is always an uncertain matter. It is best done by thoroughly cleansing the old work from all dust and loose particles. Sometimes the surface is chipped, saturated with water and painted with a coat of cement grout mixed to the consistency of thick cream. While this coat is fresh the new concrete is placed. In order that it will not harden too soon the cement grout should not be applied too long before placing the concrete. The cleaner the face of the old work where the joint is to be made the stronger will be the bond between the old and the new.

TROUBLE IN RAISING OLD ROOF

I have had an experience that I think is worth telling. The problem was to make a two story house of a one story cottage using the strictest economy.

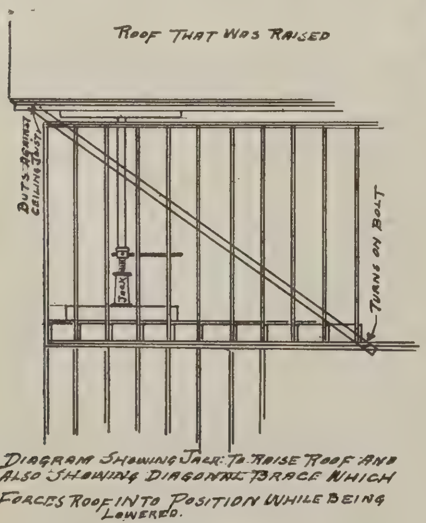


Diagram Showing Jack: To Raise Roof And Also Showing Diagonal Brace Which Forces Roof Into Position While Being Lowered.

Sectional Elevation

We cut the rafters loose from the plate and raised the roof from the square, this method being familiar to all builders. But in so doing we found by using the drop bob that the roof got moved out of plumb nearly four (4″) inches and to get it back into position over the body of the house was the problem.

I first raised the roof several inches above the plate and then I put on the diagonal braces as indicated. I then released on the jacks until the diagonal braces forced the roof into proper position. I then moved the braces and lowered the roof into position to rest on the plate.

View of Building After Roof Was Raised

D. W. DALEY
Parkersburg, W. Va.

PROPORTIONING TREADS AND RISERS

From C. S., Cincinnati, Ohio.—Some time ago I remember seeing in Building Age a rule for determining the relation between the tread and rise of a stairway. I would appreciate it if you could find the opportunity to publish this rule again or some similar method of determining this relation.

Answer—There are several rules for proportioning treads and risers for stairs. One is to take the sum of two risers and subtract it from 24 in.; the result will be the width of the tread. This rule is based upon the assumption that an average step is 2 ft. and that the labor of lifting the foot vertically is twice that exerted in moving horizontally. According to this rule, if the rise is to be 8 in. the tread will be 24 — 2 (8), or 8 in.

Another rule states that the product of the tread and rise should equal 66 in. If this rule were applied to the case above the tread would be in 8¼ in.

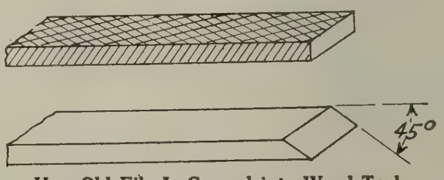
The following table is also given for treads corresponding to different rises:

Tread-Inches	Rise—Inches
6	8½
7	8
8	7½
9	7
10	6½
11	6
12	5½

WOOD-WORKER'S CHISEL FROM OLD FILE

A file of square or rectangular cross-section, when worn is ordinarily discarded as worthless; yet it may be made into another valuable new tool, namely, a wood-worker's chisel by the simple operations as follows:

1. Grind teeth off surface of file.
2. Heat file to a cherry red; then allow to cool in atmosphere. The file is originally glass-hard and too brittle for the purpose of a chisel, this treatment is therefore necessary to give it the proper temper.
3. Grind bevel for chisel on emery wheel; take caution against "burning."
4. After bevel is obtained, grind cutting edge on oil stone. The result is a very good chisel of good quality and temper for wood working.



How Old File Is Ground into Wood Tool

C. NYE
Bronx, New York

CRACKS IN CEMENT SIDEWALKS

From K. J. G., Tulsa, Okla.—I want to know how to lay a cement sidewalk to avoid cracking after it has set.

Answer.—To avoid cracks in a cement sidewalk a good foundation is necessary. The ground should be levelled off about 18 to 20 inches below the finished grade, draining the excavation to one point. The hole is then filled to a depth of 12 or 16 in. with well-tamped gravel, stone chips, ashes or cinders.

The concrete should be mixed in the proportion 1:2:3 and worked while it is being laid. The finishing coat should be laid immediately and should be a 1:2:2 mixture. Leave a ½-in. space between curb or building line and the walk to allow for expansion. The blocks should not be more than six feet square, and should be separated from each other by sheets of tar paper. The surface should be grooved with the trowel, so that if there is a tendency to crack, the cracking will take place in the joint and not in the pavement.

NUMBER BOARD FEET IN LOGS—USING CELLAR SASH IN ATTIC DORMERS

From T. C. H., Venedocier, Ohio.—Would like to ask the readers of Building Age to give me a good rule for finding the number of feet (board measure) in saw logs.

I would also like a suggestion as to the best way to install single cellar sash in attic dormers, so that the sash will swing downward on inside hinges. How can I be sure to get a watertight sash that will keep out a driving rain?

SOUND-PROOF WOOD FLOORS

From J. T. F., Birmingham, Ala.—Please tell me a good way to build floors that are sound-proof.

Answer.—Wood floors and frame construction is almost never sound-proof. It is possible to deaden the sound, however, by proper construction. Heavy felt paper is laid over the floor beams or joists. Over this are nailed 2 x 3 in. furring strips on about 16 to 24 in. centers. Another layer of felt paper is laid over these strips. Where there is a rough flooring and finished flooring a third layer of felt between them will be advisable. Let the felt over the joists and furring strips hang loose.

Filling material between the beams to further absorb vibration will be an added help. This is done by nailing 1 x 1½ in. strips on the sides of the joists near the bottom. These strips support the deafening boards which fit between the beams and carry the mineral wool or other filling.

PLASTER WALL CRACKS

From K. DeL., West Burlington, Iowa.—What kind of construction would you recommend to prevent cracking of plaster walls?

Answer.—Plaster cracks are due to settling of the house, walls, foundations, etc. When the frame work goes the plaster goes with it. Another cause of cracking is the use of unseasoned lumber.

Assuming the lumber is as well seasoned as the market affords, the only cause of cracking that can be controlled is the settlement. The joists must be strong enough to carry the weight without sagging. Joist-bearing partitions should be placed directly over each other wherever possible. Where this is not possible it will be advantageous to use a steel beam instead of wood.

The use of metal lath, lapped in the corners of the room, will greatly reinforce the plaster and prevent corner cracking.

Have you ever used any machinery or device which has saved you time and money?

Have you ever invented any way of doing a piece of work quicker?

If you have BUILDING AGE wants your experience, and will pay regular space rate for it.

Your description should tell just how you saved time and money, either by a special way of using machinery or by short cuts in construction. Point out what methods you were using before adopting your "Time Saver" and show how your new method turns the trick. You can submit as many articles as you want.

Address The Editor, BUILDING AGE, 920 Broadway, New York City.

HOW TO TEST THE PLUMBING SYSTEM

From M. McM., Rome, N. Y.—I would like to ask if you know of a simple way of testing out the plumbing of a house after it has been completed.

Answer.—Probably the simplest method is that of using oil of peppermint. After stopping up temporarily all back vents or air pipes connected to any part of the drainage system, pour two ounces of oil of peppermint into the soil pipe where it projects above the roof. Follow this with a pitcher of hot water and close the mouth of the soil pipe with rags, etc. The hot water turns the oil to vapor, and it spreads over the whole system. The odor of peppermint in the building will be conclusive evidence of a defective joint or pipe and the defect can be traced from the odor. The man who has handled the peppermint should not be allowed in the house while the examination is going on as he will undoubtedly carry the odor with him. After the test is over, remove all the temporary plugs.

POINTING MASONRY JOINTS

Form W. E. C. Co., Nashville, Tenn.—What can we do to prevent mortar falling out between masonry joints?

Answer.—When mortar crumbles and falls out from the joints of masonry it is usually due to action of the weather. The remedy lies in pointing up the walls. This is generally done as soon as they are completed by raking out the joints to a depth of about ¾ in. The joint is then cleaned with a wire brush and wet down so that the mortar will stick.

Pointing should be done with a mortar of equal parts of cement and sand, using whatever coloring is desired. It should not be done in freezing weather nor in extremely hot weather.

CLEANING PAINT

From T. J., Wilmington, Del.—I have been using strong soap and water to clean the painted woodwork in my house. I have not had much success and have spoiled the paint in some places. Please tell me what to use for this.

Answer.—The free alkali in a strong soap is very apt to combine with the oil in a paint to form soap, thereby injuring your painted surface that you are trying to clean.

Take some whiting on a piece of flannel that has been dipped in clean warm water. Rub this on the painted surface and dirt or grease will be quickly removed. Delicate colors will not be injured.

A tablespoonful of aqua ammonia in a quart of lukewarm water will also serve the purpose. In this case merely wipe the flannel over the paint. Do not rub.

PLASTERING CONCRETE SURFACES

From O. K. T., Phoenix, Ariz.—I have always had considerable difficulty in making plaster stick on concrete walls. What would you suggest.

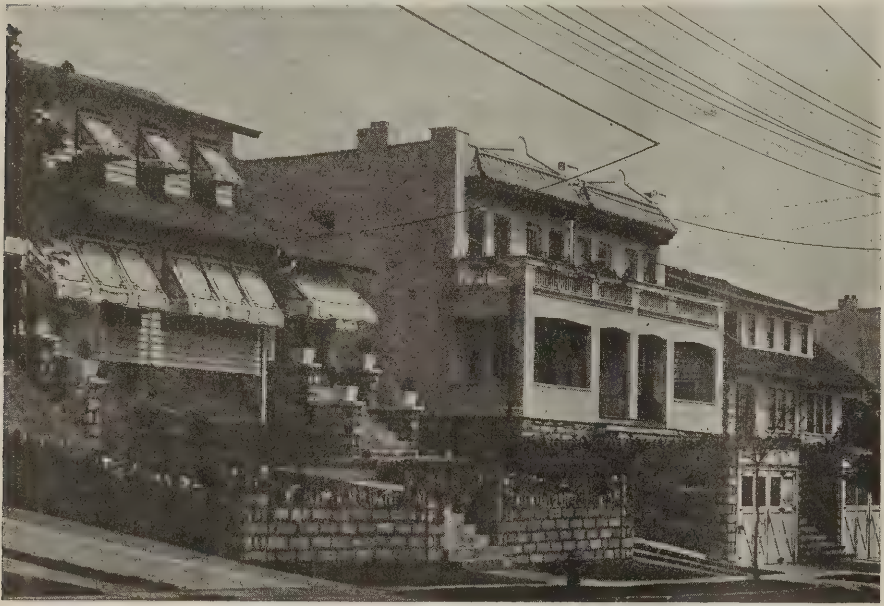
Answer.—Concrete that has been placed and set in forms always presents a more or less smooth surface when the forms are removed, due to a thin film of cement which has been brought out by tamping. Plaster does not readily adhere to this, especially if a cinder or clinker concrete is used. The concrete should be gone over first with a pneumatic or hand tool and roughened to form a key for the plaster work. This roughening should be done immediately after stripping the forms.

Two Family Houses That Are Different

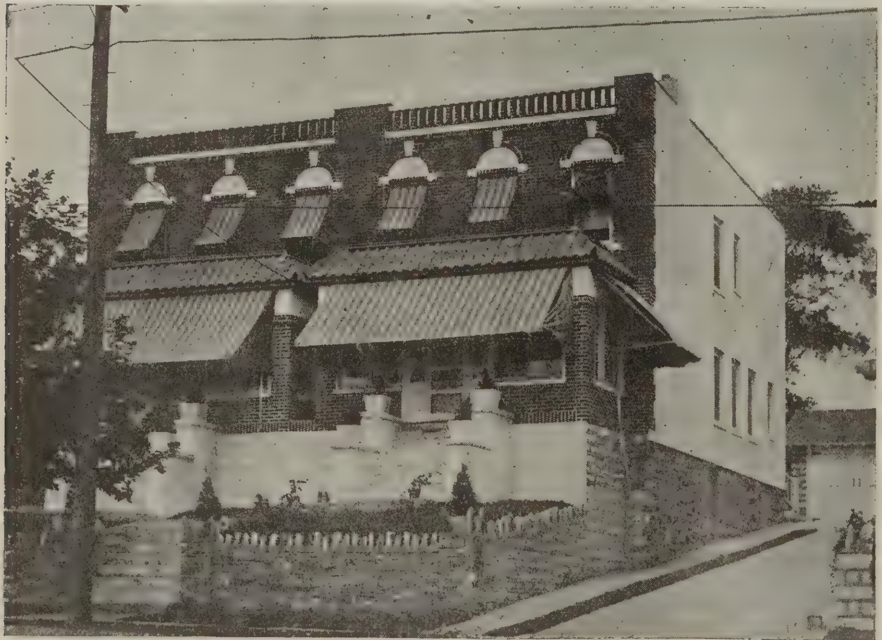
Some Six and Seven-Room Duplex Houses That Are Being Built in New York and Are Selling at $16,000 to $18,000

THE demand for two-family houses in New York is meeting a ready response by builders in sections of the city where the cost of real estate is not prohibitive for this type of dwelling. One development consisting of twenty houses of this type, located in the Bronx, is illustrated herewith.

These houses are frame, stucco on metal lath and brick veneer. The first and second-floor apartment type have 6 rooms on the ground floor and 7 rooms on the second floor, the extra room being directly over the first floor porch. The unique features of this type are the garage at the front, the large enclosed sun porch on both floors and the ample closet space that has been provided.



In this white stucco house the garage is built into the terrace, and prevents monotony in the row. This house has the advantage of a second-story porch



Note garage in the rear. The exterior brick work is set off by the rough stone wall, which is the unifying element in this whole row of otherwise varied houses

TWO-FAMILY-HOUSES IN THE BRONX, NEW YORK
William Phelan, Builder

The frame is constructed of 2"x4" studding spaced on 16-in. centers. In the frame houses this is covered with sheathing, building paper and siding. The stucco work is everywhere back-plastered on metal lath; while the brick veneer is laid after the usual method, namely, sheathing boards, a one-inch air space and the brick wall, tied to the frame by wall ties. Stonework figures largely in the walls, foundations and piers. The contrast between the colors of the gray stone, red brick, green grass and white stucco and trim produces an effect that cannot be illustrated by a half-tone.

The duplex or twin houses are provided with a garage for each family at the rear instead of the front.

One of the features of these houses is a large sun porch (really a room) for each family. This room is in the front of the house and has exposure on three sides. Entrance to this room is through French doors which separate it from the living room.

The living rooms are provided with large open fireplaces with electric wall light on either side as well as a 4-unit ceiling fixture and baseboard outlet. The only other room provided with wall lights is the dining room, where brackets have been placed on either side of the space to be occupied by the buffet.

The floors are hardwood throughout except in the bathroom where it is tile.

These houses are being put up by Wm. Phelan, Builder, and are selling at $16,000 to $18,000 as rapidly as they are conpleted, although they were a little slow at first, probably due to false hopes of much reduced building prices on the part of the buying public.

Getting Building Funds from the Savings and Loan Association

THE prospective home owner would do well to join a savings and loan association in his town. He will never regret it. Usually a dollar is sufficient to start.

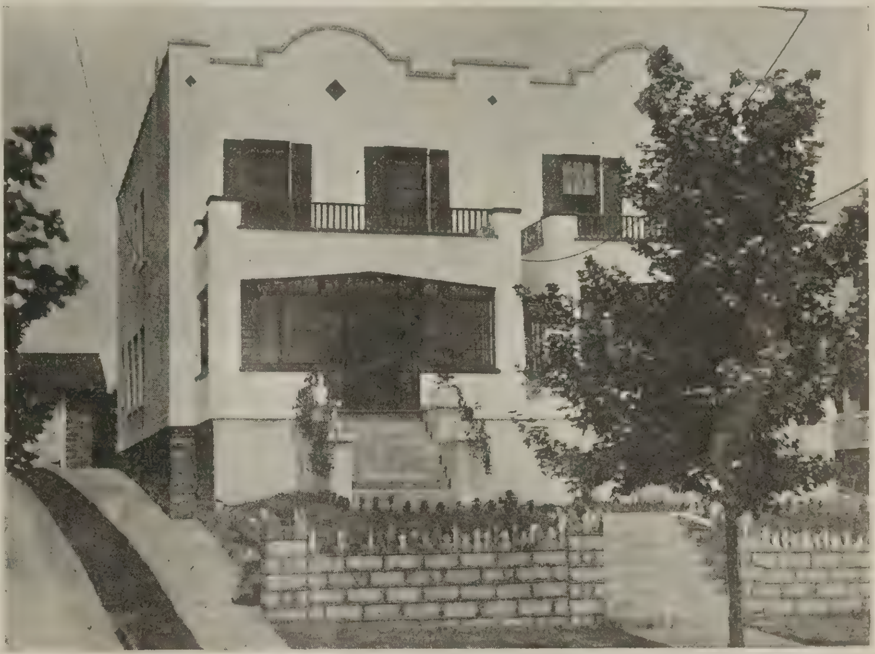
In New York State the members of the associations are of two classes—investors and borrowers. The investors are those who join the association to save. The borrowers are those to whom the savings fund are loaned upon easy repayment first mortgage security, for the purchase or erection of dwelling house.

To preserve mutuality, all members of an association are shareholders in it. Shares are usually of the nominal value of $100. To those who join an association to save, there is usually offered a choice of three forms of investment of savings. A member can subscribe to "Installment Shares" payable usually at the rate of $1.00 per month for each $100 of shares subscribed for. In this class the member is expected to make the payment each month regularly, until the accumulated payments, with the dividends compounded semi-annually, equal the face value of the shares subscribed for. Dividends in this class of investment are usually at the rate of 5% per annum, or as high as 6% in some associations.

For those who do not want to be bound to make regular payments on their shares, the Banking Law authorizes savings and loan associations to issue "Savings Shares" upon which the member can make payments as and when he pleases, of as much or as little as he pleases, from time to time, just as in the ordinary savings bank. He can withdraw at any time all or any part of his money. Upon these shares dividends are usually payable at the rate of 4½% per annum, although some associations pay as high as 5% per annum.

To those who want to make a lump sum investment in a savings and loan association in sums of $100 or multiples thereof there are issued "Income Shares" represented by a full paid certificate, upon which the association pays regular dividends semi-annually in cash to the holder of the certificate. These dividends are usually at the rate of 4½% up to 6%.

For persons desiring to withdraw from a savings and loan association, the law provides for a sixty days' notice, but Metropolitan district associations practically without exception follow the practice of paying withdrawals in cash on demand.



White stucco with dark trim has been very effectively employed. Each house has its independent entrance, always a desirable feature in two-family houses

A frame type in the same row of two-family houses designed by William Phelan. Awnings may always be chosen with a view to decorative aspect

TWO-FAMILY HOUSES IN THE BRONX, N. Y.
William Phelan, Builder

How to Prepare Ads That Build Business

Tested Ideas That Make Your Advertising Dollars Give Maximum Value

By RAY WATSON

"WHO pays for advertising?" That is an old, oft-repeated quotation. And it depends on the kind of advertising as to whether it costs anything or not.

Poor advertising costs money to the man who foots the bills.

Good advertising costs nothing.

Here's an example. Suppose you do 20 jobs a year at an average of $5,000 each. That's $100,000 worth of business. Suppose you make $500 on each job. That makes $10,000 profit in the year. You do no advertising, so you do not have to foot the bills out of that $10,000 profit.

Now, suppose you spend $300 for advertising, which, let us say, means that you have a small $2.00 ad in your local paper three times a week. If your ad is not good, your profit is $10,000—$300 or $9,700. But suppose that you get out one $5,000 job at a $500 profit. Then your total profits for the year are $10,200. And if you get ten extra jobs, your profits would be over $15,000, or $5,000 more than you would have had if you had not advertised.

Now, did that advertising cost anything? Haven't you secured $5,000 that you wouldn't have had, and that without having added a single cent to your estimates?

That 50% increase in business is not too much to expect is shown by the following extract from a letter of the Barney - Ahlers Construction Company of New York, a city where competition is exceptionally keen. It refers to their advertising in one of the local newspapers.

JOHN JONES

BUILDER

WATSONVILLE, N. Y.

Fig. 1. This is the usual kind of ad run by smaller builders. It is devoid of selling value and is good only when considered as a listing

"Nearly 50% of our contracts have resulted from leads received from our advertising. In financial volume, these contracts represented more than 50% of our total. We began advertising in January, 1919, using two insertions a week of modest size. While the effect has been cumulative, there have been instances of very quick response."

Certainly such advertising pays for itself through the increased business it brings, which is what good advertising always does. That is why good advertising can be bought and paid for without adding to the cost of the work that goes through a builder's office. Some suggest that the cost of the advertising be added to the estimate, which might not infrequently make the estimate just high enough to lose the job. But if the percentage is added, it should be more than balanced, due to the lower overhead on each job. Certain items remain fixed and the more jobs there are, the less cost for them need be allocated to each job.

Now I recognize that the average small town contractor can't spend much money for advertising—he must take small space. So this article will confine itself to advertising copy and display within the means of contractors located in small towns.

It is not the size of space that counts. It is the way that space is handled. The right kind of copy, as

Low Up-Keep

If you want low up-keep, secure the services of a contractor who specializes in the best. Jones guarantees his work.

JONES THE BUILDER
Watsonville, N. Y.

Value

In building, several thousand dollars must be spent by you. The value you get depends on the contractor. Jones guarantees his work.

JONES THE BUILDER
Watsonville, N. Y.

Reputation

Reputation is won by one's work. The First National Bank, Presbyterian Church, Residences of Frank Low, James Percy, etc., are testimonials to

JONES THE BUILDER
Watsonville, N. Y.

Figs. 2, 3 and 4. These are good newspaper ads for a builder to use. The copy and type arrangement are interchangeable. Note how they contrast with the hackneyed ad in Fig. 1.

advertising text is called, properly laid out is sure to bring good returns.

The average builder will use an ad like that in Fig. 1 and keep it standing week after week. Such an ad is only of value as a listing when someone is in need of a builder and deliberately looks through the paper for the name and address of one, just as in the larger cities he would consult a classified telephone directory. The ad has no selling value, however. It daes not tell a story any more than does a telephone listing.

Now, on the other hand, the ads shown in Figs. 2, 3 and 4 each tell a story and give a cumulative effect of reliability that is priceless. The copy may be set in any of the three fashions shown, the layouts and copy of the three ads being calculated to show different methods of type arrangement and being interchangeable. The tendency in small ads like these is to crowd them too much. Plenty of white space should be used, for this attracts the eye. Cut out one of the ads shown on this page and lay it among a number of small ads in your local paper. It should stand out prominently because of the white space. Of course, there are many other ways in which the ads could be set, but these three arrangements give and idea of good modern topography. These three ads might be part of a series, and the topography (type arrangement) chosen for one should be adhered to for each of the series. It is generally the aim of every advertising man to give a product strong individuality in its ads so that the style of the ad will associate itself closely with the product, especially if it is reputation building. Next time you pick up a magazine notice the "Campbell Soups" ad, "Kelly-Springfield Tires," etc., and you will see how this thought is carried out. So choose one style of type and type arrangement, and then stick to that pretty closely.

Ads should be changed every week. It is an easy enough matter to write a number all at once and send the copy to the paper each week. Or you can tell the newspaper's advertising solicitor just what you want and he will be glad to write the copy without charge.

In keeping with BUILDING AGE's policy of giving its subscribers as much assistance as possible on developing and handling business, a free service on advertising problems has been arranged. Ask any questions you want on letters, layouts, ads, circulars, etc.

Address Advertising Service,
BUILDING AGE,
920 Broadway,
New York City

Note that although each of the ads shown is the same size as that in Fig. 1 and costs the same, yet how much more effective they are. Each gives one concrete thought briefly but strongly worded and, if the copy is changed every week, combine to give a cumulative effect of reliability that is an invaluable asset to any builder.

If advertising is to pay, it should be continuous. Remember that if you spend $500 for advertising, the four hundred and ninety-ninth dollar is incomparably more valuable than the first, especially in reputation advertising such as the builder must do.

You won't get returns immediately in all probability, but in the course of a few weeks you will find that the right kind of advertising will start swinging customers your way. That is what advertising is for.

From time to time there will be other articles on advertising. Watch for them.

Labor-Saving Devices

IN a western city the City Fathers were proposing to buy an elaborate road machine. "But," said one, "if we buy this we will do the work of fifty men with shovels, and put them out of a job." "Yes," said another, "or of five hundred men with teaspoons, or five thousand men with toothpicks. Why not abolish the shovel?" There is talk in our vicinity of abolishing or limiting the use of pneumatic tools in stone cutting; and of limiting the width of the paint brush. Why not substitute a full-size tablespoon for the No. 6 scoop?

Porous Concrete as Stucco Base

(*Continued from page* 43)

with slabs as well as the posts carrying the porch roof. Porous slabs were also used for closing underneath the porch. For this purpose horizintal stringers were put between the porch piers with the lower one set high enough above the ground to keep dry. The slabs were nailed to these stringers and were buried with the lower edge in the ground, and stucco was applied to them the same as to the side walls.* The weight is carried entirely by the stringers and no foundations or footings were required.

After the slabs were nailed up and the roof tiles were set up, plastering could be done inside because the waterproof paper and the slabs finished the house on the outside in such a way that no damage was to be expected from rain or storms.

The rough and porous surface of the slabs makes a good bond for the first coat of stucco. The usual precautions were observed in not letting the stucco dry too quickly. The second coat, to which a waterproofing was added, was put on a few weeks after all the outside work on the house was completed. The first coat was 3/8″ thick and the finish coat ¼″ thick.

The following is a list of the cost of this building:

Excavating the Cellar and Grading	$ 158.00
Building Permit	7.00
Surveyor	16.00
Mason material and Mason work	2545.33
Lumber	1274.00
Sash and Doors and all Mill work	1324.00
Carpenter Labor	1250.00
Cement Roofing Tile and Labor	336.78
Plumbing and Heating	1650.64
Hardware	130.24
Electric Fixtures	149.85
Electrical Work	108.75
Painting	361.00
	$9311.59

What the Editor Thinks

Builder and Contractor Advertising Pays

WHEN contractors like the Barney - Ahlers Construction Company, New York, and the Ferro-Concrete Construction Company, Cincinnati, indorse the statement that advertising for the builder and contractor pays, and back it up by saying that it has increased the total volume of their business, in some cases 50%, it is time to sit up and listen.

Publicity is the life of financial success in business. The builder who keeps his work before the public will have a larger bank account at the end of the year than the man who ignores the possibilities of consistent advertising.

On page 25 of this issue Ludolf M. Hansen gives proper advertising a large share of the credit for the rapid and successful growth of the Ludolf M. Hansen Company, Green Bay, Wisconsin. Twenty-six years ago he was an immigrant cabinet maker. Today his yearly contracts top the million-dollar mark. In his interview with BUILDING AGE, Mr. Hansen lets the public in on some of his secrets.

The benefits reaped by these large contractors are to be had by the small builder if he will but use some of their methods.

To be continuously profitable, advertising must be honest. Where facilities are poor no amount of advertising will compensate. Advertising will not make a profit on contracts that are not carried to a successful conclusion. Good judgment, good workmanship, and real service are necessary before advertising can help. They must exist to justify advertising, for without them there is nothing to advertise.

Moreover, a well-planned advertising campaign gives personality to an organization. The man in the street, in the country, or in the city, can visualize and understand the relation between the advertiser and the house he wants to build himself.

On page 48, also, Mr. Ray Watson, which, by the way, is a pen name for a certain specialist in advertising and sales promotion work, outlines a plan of advertising that is within the means of the small builder and that will bring in business.

Advertising for the builder means to create a demand for his services to execute the work. The present demand for building, alterations and improvements today is keen, but most of this work is going to builders who advertise. The builder who keeps himself before the public with records of how expeditiously he can complete a structure and the distinctive features of his work, organization, and service, is that much ahead of the builder who has neglected the opportunities offered by advertising as a business getter.

Advertising is just as essential to the welfare of a small business as to a large business. It is good for the builder as well as the manufacturer.

Who is Responsible for High Costs?

IT is generally conceded even by wage-earners themselves that the continuing wage reductions are necessary to bring the country back to a sound financial basis and to permit products to be manufactured at a cost that will permit their ready sale.

That, of course, is the obvious and, therefore, the first thing to be done. Yet it is only a step in the right direction, as shown by a survey of the Committee of the American Engineering Council. This committee reports that there are other wastes due to inefficient management, amounting to millions of dollars annually. The committee states, "More than 50% of the responsibility for these wastes can be placed at the door of the management, and less than 25% at the door of labor."

This is a very strong statement, yet there is much truth in it. And it points directly towards a condition that prevails in the building field just as it does elsewhere.

No contractor will willingly allow the elusive dollars to slip through his fingers if he can help it. And yet more than one dollar is charged to operating cost when it could either appear as profit or make itself felt in reduced selling price if the builder was wise enough to use various kinds of labor-saving equipment that are at his disposal.

Perhaps it is a portable saw rig, a new kind of scaffolding, a more economical type of concrete form, or even a new material that will cut the cost of each building.

Suppose that only $50 is saved on each building by using a certain improved type of equipment—and any good equipment will do more than that. That saving means a clear profit of $2,500 on fifty buildings, a profit that the contractor can either share with the owner in the form of a lower bid—or pocket.

We know one firm of builders that can build a house for $8,500 that other contractors in the same town can't touch for less than $9,500. And they make money, more than their competitors. They do it by developing certain men as specialists in different phases of work, by careful cost keeping that shows immediately if the work is going over its proper amount, by using the best and latest equipment chosen for its suitability to the character of the work it will be most used for, and by routing equipment so that it will be kept as busy as possible and not stand idle.

It is by these tactics, not by skimping, that builders can logically quote a low figure. Every builder owes it to himself to follow such a policy, for it is the surest way to build a reputation. And reputation is the thing that dictates the selection of the builder on all quality work.

Rebuilding Pueblo, Colorado

WHEN a disaster like the recent flooding of Colorado cities by the Arkansas River is still uppermost in the minds of its unfortunate victims, it is almost useless to speak of compensations. And yet, just at the beginning, steps must be taken, and taken at once, to rebuild the devastated parts and relieve the stress of the people.

How will this be done? Precedent in the instances of the Johnstown flood, the Galveston flood, the San Francisco earthquake, the Baltimore conflagration are available. All these disasters called for quick action.

An opportunity is now afforded to builders in the ruined sections of Pueblo to correct errors of planning, to make the city one of greater beauty, greater efficiency, greater safety than it had ever dreamed of being before. By the elimination by nature of unwholesome and congested districts, the destructive work that the citizens themselves should logically have done toward this end was made unnecessary. To them is given the chance to rebuild—with all the modern knowledge of safety and beauty that that implies. San Francisco did it; Baltimore did it; France is doing it in her devastated regions. Haste is important, but it is not everything. It must not supersede every other consideration. Thought must be had for the future. The city that had grown up haphazardly from a little mining camp has reached the dignity of cityhood without that outward semblance of civic pride that every city everywhere is trying to acquire. Whether she will now acquire it or not rests with her builders.

Review of Building Situation

CONSTRUCTION activity in May, according to figures published by the F. W. Dodge Company, was 9½% greater than in April. Contracts awarded in the twenty-seven northeastern states of the country during May amounted to $242,093,000, compared with $220,886,000 in April.

The increase in activity should have been greater except for widespread labor troubles. In New England and throughout the Middle West, where wage disputes have been pretty general, building activity kept up during May at about the same rate as in April. Substantial increases in activity were reported in the territory along the Atlantic Coast from New York to South Carolina.

Residential building continues to lead all other classes. In May contracts for this class of construction amounted to $82,982,000, or 34% of the total. Public works and utilities amounted to $64,999,000, or 27% of the total; business buildings, $29,494,000, or 12% of the total; educational buildings, $24,462,000, or 10% of the total; industrial buildings, $20,404,000, or 8% of the total.

Building activity of the first five months of the year compares very favorably with the same period of previous years. The total investment represented by building contracts let from January 1 to June 1 has amounted to $839,357,000. At the end of January activity from the first of the year to date was 6% behind the average for the preceding five years; at the end of February, 11% behind; at the end of March, 4% behind; at the end of April, 5% ahead; at the end of May, 11% ahead.

The demand for new construction still continues strong. Contemplated new work was reported in May to the amount of $462,785,000, which is 18% greater than in April.

During the first five months of the year more than two billion dollars in contemplated new work has been reported. This is considerably more than double the amount of contracts awarded, and indicates the pressure of the demand for construction. It is to be hoped that the labor disputes now in evidence will be rapidly settled so that the summer months may witness a substantial increase in activity.

CONTRACTS AWARDED.

	CLASS OF BUILDING							
Section of Country	Residential	Industrial	Business	Public Works and Utilities	Educational	Other	Total	Per Cent. Increase + or Decrease —
New England	$7,405,000	$3,585,000	$2,280,000	$2,617,000	$1,305,400	$48,015,600	$65,208,000	+5
New York Dist.	36,492,000	1,891,000	8,031,000	7,776,300	1,473,600	125,949,100	181,613,000	+14
Middle Atlantic	13,098,000	6,201,000	4,271,000	11,647,000	2,444,900	5,948,100	43,612,000	+60
Pittsburgh Dist.	10,674,000	752,500	4,244,000	17,816,000	5,211,000	2,597,500	41,295,000	—1¾
Middle West	13,203,000	7,891,900	10,271,000	23,207,000	11,472,000	6,849,100	72,894,000	—3
Northwest	2,110,000	83,400	397,500	1,948,000	2,553,000	429,100	7,521,000	—2
Total	$82,982,000	$20,404,000	$29,494,000	$64,999,000	$24,462,000	$189,788,500	$242,093,000	+9½

CONTEMPLATED PROJECTS.

	CLASS OF BUILDING							
Section of Country	Residential	Industrial	Business	Public Works and Utilities	Educational	Other	Total	Per Cent. Increase + or Decrease —
New England	$9,067,200	$3,241,000	$4,247,000	$2,198,200	$3,093,400	$6,559,700	$28,406,900	—32
New York Dist.	57,695,100	4,982,900	9,691,700	6,424,200	8,132,000	8,623,400	95,549,300	+4
Middle Atlantic	21,817,000	7,617,000	5,960,800	21,752,200	15,823,300	16,136,300	89,106,600	+59
Pittsburgh Dist.	17,670,200	3,649,000	7,323,600	15,565,000	3,195,500	7,279,000	54,682,300	—1
Middle West	31,686,800	12,283,800	10,394,400	87,782,300	13,152,000	21,909,400	177,208,700	+46
Northwest	3,432,500	275,600	1,605,500	8,050,000	1,104,600	3,363,500	17,831,700	—4
Total	$141,368,800	$32,049,300	$39,223,400	$141,771,900	$44,500,800	$63,871,300	$462,785,500	+18

Trend of Material Prices

THE following are wholesale prices of basic building materials in the three markets which set prices for the rest of the country.

These prices are presented to show the trend of the wholesale market, which forecasts prices in the retail market. They are not prices which the average contractor can buy at, but are quoted to show him the movement of materials so that he can buy to better advantage.

Followed in conjunction with the Review of Building Conditions, these prices will prove invaluable.

All prices are for carload lots, F. O. B. market quoted, unless otherwise noted.

The Building Material Market has held firmly during the month of June. Reductions in structural steel, some grades of Douglas fir and hardwood flooring have been effected. It is noteworthy that the market price of western red cedar for siding has stiffened, selling for $1.50 more than a month ago.

NEW YORK PRICES

	June 23	May 23
LONG-LEAF YELLOW PINE—		
B. & Better Flat Grain Flooring, 2½" Face	$54.50	$54.50
Dimension, S1S1E, No. 1 Common, 2x4", 10'	38.00	38.00
Timbers, Merchantable, '05, 12x12", 10 to 20'	45.00	45.00
B. & Better Ceiling, ½x3¼"	36.00	36.00
B. & Better Finish, 1x4"	51.00	51.00
No 1 Common Boards, 1x8"	40.00	40.00
NORTH CAROLINA PINE—		
No. 2 and Better Flooring, 13/16x2½"	$55.00	$55.00
Roofers, 13/16x5½"	29.00	29.00
DOUGLAS FIR		
No. 2 Clear & Better V. G. Flooring, 1x3"	$75.50	$75.50
No. 1 Clear V. G. Flooring, 1x4"	74.00	....
No. 2 Clear & Better Ceiling, ⅝x4"	35.00	37.25
No. 2 Clear & Better Novelty Siding, 1x6"	42.25	43.00
No. 2 Clear & Better V. G. Stepping	87.00	87.00
Dimension, S1S1E, 2x4", 16'	40.00	44.00
Timbers, S1S1E, 12x12", 16'	50.00	54.00
WESTERN RED CEDAR—		
B. C. Perfection Shingles, per M	$7.45	$7.45
Washington Perfection Shingles, per M	7.15	7.15
Clear Bevel Siding, 1½x6"	45.00	43.50
CANADIAN SPRUCE—		
No. 1 Lath, 1½"	$8.00	$8.00
Dimension, 2x4", 10 to 16'	47.00	48.00
CALIFORNIA REDWOOD—		
Clear Bevel Siding, ½x6"	$41.50	$41.50
Clear Colonial Siding, ¾x8"	70.00	70.00
Clear Finish, S2S, 1x6 to 12"	100.00	100.00
CYPRESS—		
4/4 Factory Selects (New Grades)	$85.00	$85.00
"A" Finish, 1x4" to 10"	117.00	117.00
Firsts and Seconds, 1" (Old Grades)	110.00	110.00
HARDWOOD FLOORING—		
Clear Quartered White Oak, 13/16x2x2¼"	$147.50	$147.50
Clear Plain White Oak	107.50	108.50
Clear Maple, 13/16x2¼"	95.00	95.00
Clear Quartered White Oak Parquetry Strips, 5/16x2"	142.00	143.50
Clear Plain White Oak Parquetry Strips	98.00	99.00
COMMON BRICK—		
Per M. f. o. b. job	$18.00	$18.40
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers, f. o b. dock	$2.40	$2.40
STRUCTURAL STEEL—		
Cents per pound to large buyers	2.38	2.58

CHICAGO PRICES

	June 23	May 23
YELLOW PINE—		
Boards, 1x8, No. 1 Com	$33.00	$40.00
Casing and Base, 4—6 in	55.00	55.00
Ceiling, ⅝x4, B & Btr	36.00	36.00
Dimension No. 1, 2x4, 12 to 14 ft	31.00	30.50
Drop Siding, 1x6, B & Btr	38.00	38.00
Finish, 1x4, B & Btr	50.00	48.00
Flooring, B & Btr. E. G., 1x3	68.00	68.00
Flooring, B & Btr. F. G., 1x3	42.00	42.00
Lath, 4 ft., No. 1	5.90	5.50
Timbers, Long Leaf No. 1, 10—20 ft., S 4S, 6x12 to 12x12	40.00	45.00
NORTHERN HEMLOCK—		
Boards, No. 1, 8 to 16 ft., 1x6 to 8 in	$33.00	$34.00
Lath, 4 ft., No. 1	9.00	9.25
DOUGLAS FIR—		
Boards, No. 1, S2S, ¾ in., 1x8 to 10 in	$30.75	$31.25
Dimension, No. 1, S1S1E, 8 ft, 12 ft, 14 ft, 2x4 in	30.00	30.50
Drop Siding, 1x6 Pat. 106, No. 2, C & Btr	36.50	35.50
Flooring, V. G., 1x4, No. 1	68.50	66.50
Lath, 4 ft., No. 1	7.25	7.25
Timbers, No. 1 Com., 12x12 in. & under, 40 in. & under, rough	36.00	39.50
GULF COAST RED CYPRESS (New Grades)—		
4/4 Selects	$83.25	$83.25
Finish, S2S, 1x4 to 12 in. A	110.50	110.50
Lath, 4 ft., No. 1	8.20	8.20
HARDWOODS—		
Maple Flooring, 13/16x2¼, clear	$95.00	$95.00
Oak Flooring, 13/16x2¼, Cl. Pl., White	105.00	100.00
IDAHO WHITE PINE—		
Boards, S2S, 1x8, 16 ft., No. 1	$93.00	$93.00
WESTERN SPRUCE—		
Bevel Siding, ½x4, A	$38.00	$33.50
WESTERN RED CEDAR—		
Bevel Siding, ½x4 in., clear	$42.00	$42.00
Shingles, Extra Clears, 16 in	4.26	4.33
REDWOOD—		
Bevel Siding, S1S1E, 10 ft., 20 ft., ½x4, clear	$38.25	$38.25
Finish, S2S or S4S, 1x6 to 8 in	91.50	91.50
COMMON BRICK—		
Per M. f. o. b. job	$12.00	$12.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers	$2.17	$2.17
STRUCTURAL STEEL—		
Cents per lb. to large buyers	2.38	2.58

ST. LOUIS PRICES

	June 23	May 23
YELLOW PINE—		
Boards, B & Btr., E. G., 1x3	$66.00	$66.00
Ceiling, ¾x3¼, B & Btr	41.00	41.00
Dimension, No. 1, S1S1E, Short Leaf, 2x4 in., 12 & 14 ft.	29.50	29.50
Finish, S2S, B & Btr., 1x4	47.00	47.00
Flooring, B & Btr., E. G., 1x3	66.00	66.00
Flooring, B & Btr., F. G., 1x3	40.00	40.00
Lath, 4 ft., No. 1	5.25	5.00
Timbers, No. 1, rough, short leaf, 6x12 to 12x12 in. 10 to 20 ft	34.00	35.00
Timbers, Long Leaf, 4x12 to 12x12 in., 10 to 20 ft	39.00	41.00
GULF COAST RED CYPRESS (New Grades)—		
4/4 Selects	$84.50	$84.50
Drop Siding, Flooring, Ceiling, Casing and Base, 1x4 in., 6x8 in., A	112.75	112.75
Finish, 1x4 to 10 in., A	112.75	112.75
Lath, 4 ft., No. 1	7.75	7.75
DOUGLAS FIR—		
Ceiling, F. G., ⅝x4 in., No. 2, Cl. & Btr	$29.50	$30.50
Dimension, No. 1, S1S1E, 2x4 in., 8, 12, 14 ft	30.00	30.50
Drop Siding & Rustic, 1x6 in., No. 2, Cl. & Btr	37.00	38.00
Finish, F. G., S2S or S4S, 1x4 in., No. 2, Cl. & Btr	61.25	62.25
Flooring, 1x4 in., No. 1, Cl., V. G	65.50	65.50
Stepping, V. G., 1¼x10 in. & 12 in., No. 2, Cl. & Btr	77.75	77.75
NORTHERN WHITE PINE—		
1x4 in., 6 in., 8 in., B. & Btr	$132.75	.....
CALIFORNIA REDWOOD—		
Finish, S2S, Cl., 1x6 in	$91.50	$91.50
Siding, 4 in. Bevel, 10 to 20 ft	38.25	38.25
8 Inch Colonial	66.75	66.75
8 Inch Bungalow	68.75	68.75
PACIFIC COAST SPRUCE—		
Bevel, Siding, ½x4 in., A	$36.00	$34.50
Finish, S2S, 1x12 in	89.00	84.00
HARDWOODS—		
Maple Flooring, 13/16x2¼ in., Clear	$96.75	$96.75
Oak Flooring, ⅜x1 & 2 in., Clear Qtr. White	110.00	110.00
RED CEDAR—		
Siding, ½x6, Clear	$41.00	$41.00
Shingles, Clears	4.21	4.31
COMMON BRICK—		
Per M. f. o. b. job	$12.00	$18.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers	$2..60	$2.60
STRUCTURAL STEEL—		
Cents per pound to large buyers	2.475	2.675

Exterior Combined Barn and Silo

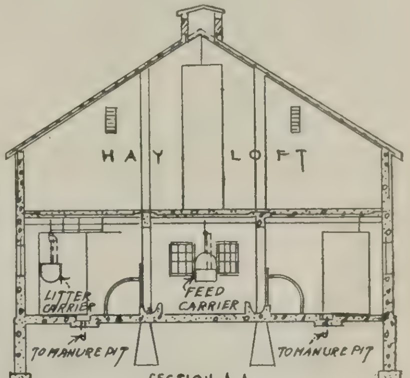
A Concrete Barn and Silo for the Up-to-Date Farmer*

Will House Ten Cows and Four Horses—Construction Details

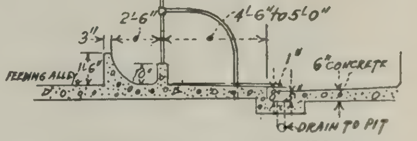
THE plan arrangement of the standard cattle barn has been developed by manufacturers of cattle stanchions and feed and litter carriers. In the example shown here the two rows of cattle stalls are arranged so that the cattle face the center aisle from which the feed and water are distributed. The concrete manger is formed in the floor structure. The stall floors are of concrete, pitched slightly toward the back, where a gutter extends their entire length. The stanchions and stalls are formed of iron pipe. Separating metal partitions prevent the cattle from robbing each other.

Feed is distributed by an overhead carrier. The manure is carried out and automatically dumped by another carrier. A hay carrier permits good distribution of the hay stored in the loft. The hay is delivered to the first floor by chutes. The silo at the center of the one side of the barn is 10 ft. in diameter.

In general the concrete floor for stalls and litter alley should be 4 to 5 in. thick, finished rough with a wooden trowel to provide secure footing. Feed alleys, gutters and mangers should be finished smooth with steel trowel for ease in flushing. If desired, a removable board, cork block or wood block surface may be laid over the concrete stall floors. This is not necessary when sufficient bedding is provided.



SECTION A-A



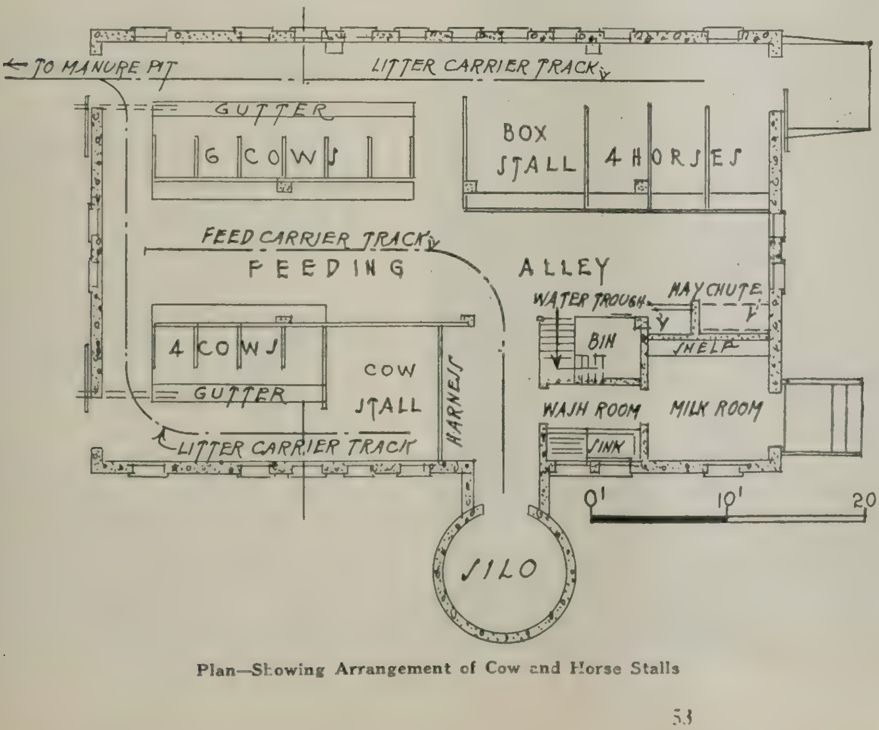
DETAIL SHOWING LEVELS OF COW STALLS

Cross Section Above—Detail Cow Stalls Below

The standard size for cow stalls is 3'-6" by 4'-6" long from manger wall to drop gutter. Do not attempt to lay a barn floor in sections greater than 10 ft. square in one operation, or cracks may result.

Eight inches from the stall floor, or six inches from the alley floor is ample depth for the gutter. Some modern designs omit this gutter, allowing the litter alley to drain to the center.

Where there is no good sand base for the concrete stall floors, lay the concrete on a 6-in. base of coarse broken rock, screened gravel, or well-tamped cinders.

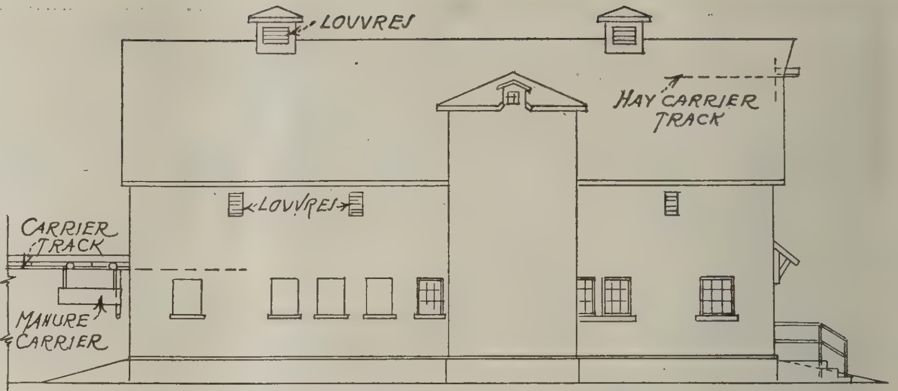


Plan—Showing Arrangement of Cow and Horse Stalls

---

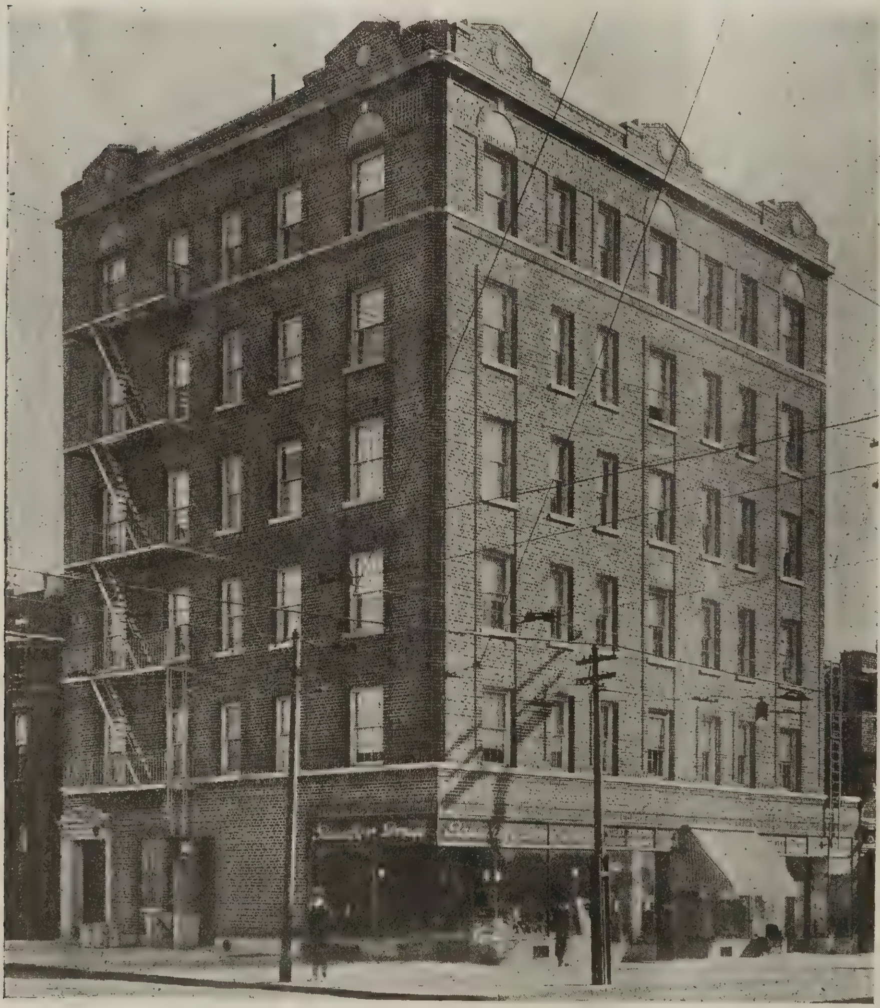
*Designed for Alpha Portland Cement Company by Frank T. Fellner, Architect.

Successful farmers often disagree as to what is the best interior barn arrangement and equipment. The barn shown is a suggestion that has met considerable popular favor. It is almost universally agreed, however, that concrete floors and walls give assurance of good sanitation and healthy stock because they are easy to clean and keep clean. There is nothing automatic about this feature. They must be flushed regularly else the advantages are lost.



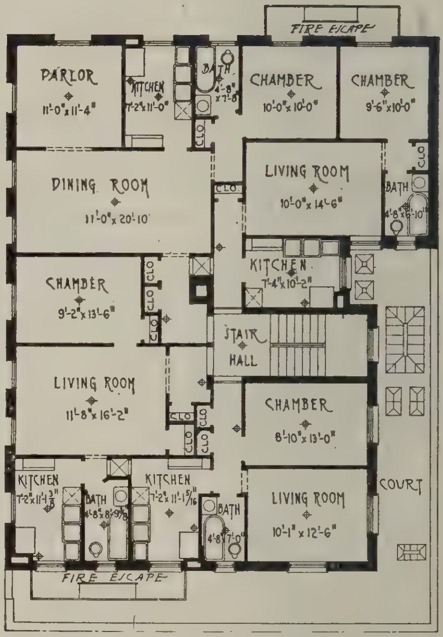
Side Elevation—Combined Barn and Silo Showing Manure and Hay Carriers

A Modern Apartment House That Brings Good Rentals



MODERN SIX-STORY APARTMENT HOUSE, NEW YORK CITY

This apartment house was designed and built when the demand for housing in New York City was at its height. Also, incidentally, building material prices were at their peak. The total cost is said to have exceeded $150,000.



Typical Floor Plan Above First Floor

THE apartment illustrated here was designed by Jacob Gescheidt & Company, Architects and Builders, to give compact and livable three-room apartments without sacrificing too much of the comfort one wants in one's home. The typical floor plan shows how this was accomplished.

Each apartment has one bedroom, bath and kitchen. The four-room apartments have a dining room and parlor. The three-room apartments have a combined living room and dining room. There is a good supply of closet space, considering the compactness of the plan.

A stairway abruptly turning right about, as does this, conserves space for the smaller house

How to Make Stairs That Will Be Comfortable

Origin and Development of Stairs—Some Pointers in Stairway Design and Construction

STAIRWAYS became necessary when builders began to erect buildings of more than one story, but they do not seem to have reached architectural importance until the tenth century was well along. Previous to the Roman Empire, nearly all classes of buildings were of only one story. Ordinary steps of utilitarian character are known to have been used in Crete as early at 2000 B. C. and in the Greek temples and Roman theatres to give access to galleries. But in the mediæval period they began to appear in churches having high choirs above the crypts, while the multiplication of towers led to the building of winding stairs. It was the Renaissance that gave the stairway architectural dignity and even splendor, first in Italian palaces and later in France, where both the spiral type and the rectangular form were treated with much magnificence.

It is rather modern to have one main stairway. In mediæval times there were numerous small stairways in retired places, to aid in defense. A dwelling was divided vertically into suites, having little or no lateral communication. An additional retired stair is a convenience in the modern house. It gives a certain privacy to a set of rooms which they would not have when opening only on the general passage way of the dwelling.

To effect economy it is often possible to have a short flight of say four steps end at a landing. The rest of the flight continues from the landing at a right angles, and from which a second flight of four steps descends at the opposite right angle. This affords substantially a front and a back entrance to the same staircase.

The primary object of stairs in the house is to afford a safe and easy communication between floors at different levels. To make this communication easy, the rise and width or tread of the steps should be regular and suitably proportioned to each other with convenient landings. There should be no winding steps and the rail, which is fixed to render the use of the staircase safe, should be strongly fixed with its top at a convenient height for the hand. An often used rule is to make the sum of the rise and the tread equal to about 17 inches.

The forms of staircases are various, the simplest being a straight flight. This type should only be used to a low story. In small houses where space cannot be allowed for convenient forms, they are often made angular or circular with winding steps. In larger buildings where convenience and beauty may both have due consideration, winding steps are rarely introduced when it is possible to avoid them.

Well designed stairs should be

This stairway, with its frequent landings, is easy of ascent. Note the window to light it.

planned as simply as possible to afford easy ascent to the higher floors. The stair must be placed in a position easy of approach and convenient for both the lower and upper rooms. It must be well ventilated and lighted. The absence of sufficient light may prove the cause of serious accidents.

At no part should the head room, that is, the height between the level of a tread and that portion of the structure immediately above it, be less than 7 feet. Straight flights should be composed of not less than 4 and not more than 12 steps. If it is desired to continue more than this number in a straight line, a landing equal in length at least to the width of the stairs should be provided before starting up the next flight.

Winders should be avoided if possible, but should they be found necessary. it is advisable to put them at the bottom of a flight rather than at the top, the reason being that should they be the cause of an accident, the unfortunate victim will not have far to fall.

The material used in making wooden stairs should be carefully selected. Only such pieces should be used as are sound in every way, and that match in color and grain. But the most careful selection of wood is of little avail if after it is put in use it warps or cracks or pulls out of shape. This is what happens if the wood has not been throughly seasoned. Seasoning increases both strength and hardness. Kilndrying is found to reduce the weight and makes the wood less liable to shrinkage and more resistant to decay.

Excessive economy is often practiced in cellar steps. The fact that they are infrequently used seems to make them unworthy of thought in some opinions. On the contrary, accident are much more likely on unfamiliar stairs than on those in regular use. Cellar stairs should above all be well lighted. The head room should as above stated be 7 feet, but if it is necessary to reduce it, it should still be no less than 6 feet 6 inches. Inasmuch as furnace work is usually carried on in cellars, and clothing and other valuables are stored there, it is but a reasonable precaution to have the cellar steps safe and fire-resisting. The rickety stairs with broken banisters and low head room, dark and tumble-down invite danger and should never be tolerated.

Here is a movable stairway leading to an attic. It may be drawn up out of the way when not in use, at considerable economy of space and cost

Built-in attic steps are a new and useful feature. They are similar to a ladder with a solid wall behind it, the ladder being so hinged as to rest horizontally parallel with and nested in the ceiing, the wall underneath it harmonizing inconspicuously with the ceiling, when the ladder is not in use. It may be readily pulled down when access to the attic is desired, and as readily moved into place again. There is also the so-called movable stairway which is similar in operation and serves the same purpose.

The construction of stairs is important. They receive more and rougher usage than other parts of the house, because the wear is all localized upon a small area. In every two-story house the stairway is an important architectural feature. The stairs are seen by everyone who enters the building for they are placed conspicuously either in the hallway near the entrance or at one end of the living room.

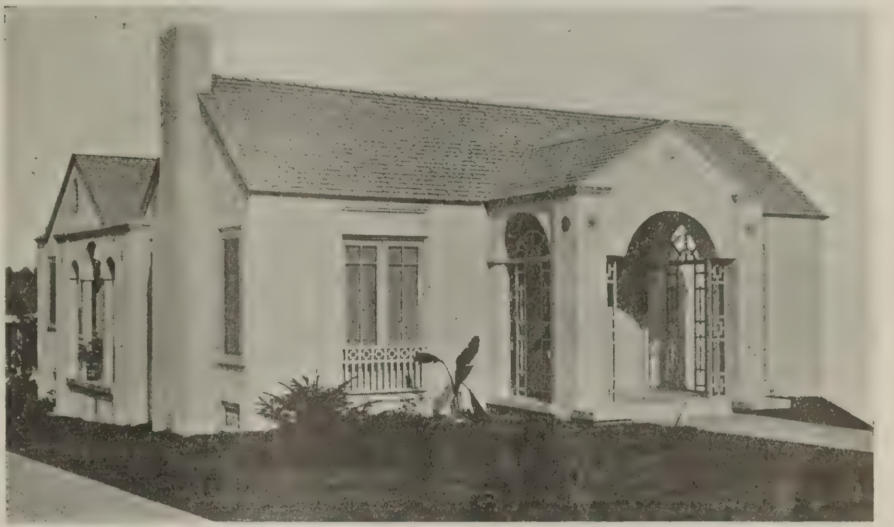
Certain laws governing stair construction in public buildings are in force in every community. While there are slight variations, their purpose is for safety. Fire-resisting material is demanded. The principal stairway in every dwelling should be ventilated by means of a window or skylight opening directly into the external air. In churches, public halls, schools, etc., stairs should be supported and enclosed by brick walls at least 9 inches thick. The treads of each flight should be of uniform width, and stairs, corridors or passages should be 4 ft. 6 in. wide unless the building is for the accommodation of less than 200 people, when it may be 3 ft. 6 in. If more than 400 people, the width must increase 6 inches for each added 100 up to 9 ft. Staircases 6 ft. wide or more should be divided by a handrail.

The white and mahogany stained stair hall with its Colonial features is always welcoming, graceful and dignified. It is, and properly, one of the most popular types where room is available.

An Attractive Stucco Bungalow

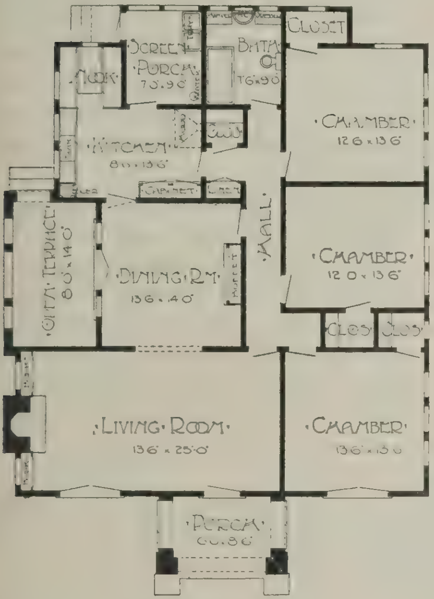
Six Rooms and Bath on 35 by 40 Foot Plan
Large Rooms Well Laid Out

By CHARLES ALMA BYERS



Stucco Bungalow, Los Angeles, California
Mixed Colonial and French design

THE little house illustrated by the accompanying photograph and floor plan present, in exterior treatment, some interesting details in modification of the style of the so-called Colonial bungalow. A sort of Moorish arch treatment, for example, has been given to the little front porch and to the open terrace or unroofed porch at the side.



Ground Floor Plan

Artistic lattices in the front and sides of the entrance porch, similar grilles beneath the two pairs of French windows on the front, ornamental French heads to these windows and plaque-like decorations in the entrance gable and the tops of the porch pillars have also been introduced.

The exterior walls of the house are of very light gray cement-stucco over frame construction. All trimming, including the lattice and grille work, is done in bluish-gray except the plaque ornamentations, which are in orange-yellow and bright green. The shingled roof is painted dark green, and the front porch and side terrace are floored with cement.

The interior woodwork is pine finished in old ivory, with a small amount of mahogany trim, in the living room and hall. Pine finished in white enamel in the bath room and kitchen. Hardwood floors prevail throughout, except in the bath room, kitchen and screened porch, tile being used in the bath room and pine in the other two places. The walls of the living room, dining room and front bed room are papered. In the hall, the two back bed rooms and the kitchen porch they are tinted. In the bath room and kitchen they are finished to a height of four feet, six inches with a smooth, hard plaster coat which is enameled like the woodwork. The fireplace of the living room has a tile hearth and a mantel of brick and wood, in Colonial design.

The house has no basement or cellar, although the one or the other might have been easily provided. The equipment includes gas radiators built into the floor for heating and all other modern conveniences. The De Luxe Building Company built the house.

Electric Stoves in New Apartment

ANOTHER evidence of the demand for electrically equipped homes is the equipment of the Indian Village Manor Apartments, Detroit, with electric ranges in the kitchens. One would naturally expect that electric appliances would get their initial foothold in the higher class residences and apartments, and this is just what is happening. Undoubtedly, in the near future, they will find their way into the moderate priced homes, and eventually become firmly established there as well.

Indian Village Manor Apartments,
Detroit, Michigan

Facts About Windows

Various Types and Location—Standard and Special Construction — Improved Types to Give Full Opening

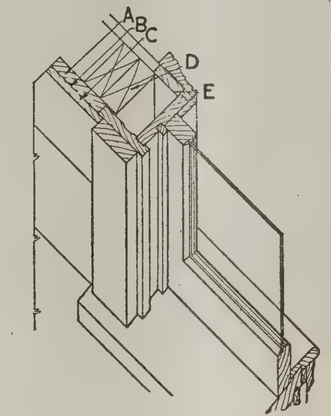
IN the early days of Rome and Greece where outdoor life was possible, windows were small and inconspicuous. They were not even used in classic temples because public ceremonies and sacrifices were always held in the open.

It was not until the application of glass to window design that windows assumed some of the importance that is today bestowed upon them. Windows were originally simple openings in the wall, closable by shutters. Afterward, but before the days of glass, mica was used.

While the story of windows is interestingly interlaced with man's early struggles, the modern builder will lay more stress on their structural aspects—their placing, their hardware, and other equipment, and the various types such as casements, dormers, bays, and so on.

The window today is closed with glass set in a sash. This may be of wood or metal and may be fixed to be opened at will. Commonly the sash is in two halves, either hinged at the sides and opening in the middle as in French and casement windows, or sliding up and down grooves with cords and counterbalancing weights as in double-hung widows. The sash is sometimes pivoted so as to turn horizontally or vertically. Large windows are often subdivided by fixed vertical bars or mullions of wood, metal or stone, and one or more horizontal bars or transoms.

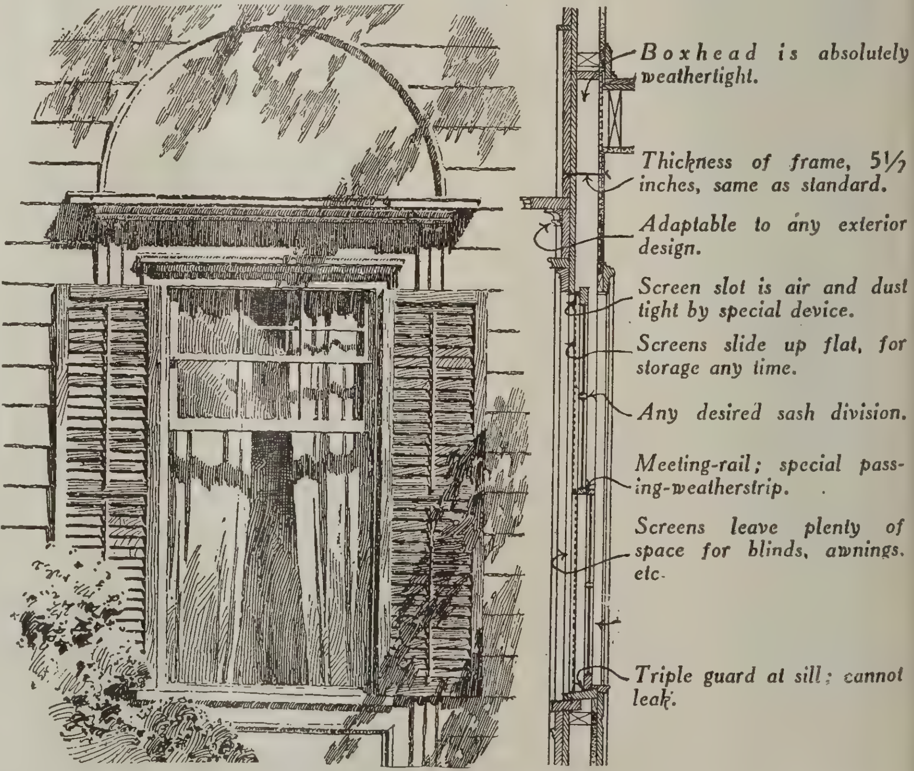
Windows should be plentiful not necessarily in numbers, but in actual glass area. Full length casement windows have limitations, especially in small houses with bedrooms located on the ground floor, where the window leads on to a porch. The only way of securing air in such a room is literally to open a door to the public.



Standard Window Construction

It is good practice to group windows in pairs or threes for several reasons. It increases the apparent size of the room; it permits a more usable expanse of unbroken wall space; it increases the decorative interest within the room and the architectural possibilities of the exterior; it is a more satisfactory arrangement than a single window of equivalent size which would be awkward to hang and more expensive to replace in case of breakage.

Every stairhall should have a window to provide light and prevent accidents. A good decorative result is obtained by placing such a window fairly high at a landing, so that there may be room beneath it for a small bench. Hall windows may be of colored or stained glass and of circu-


Boxhead is absolutely weathertight.
Thickness of frame, 5½ inches, same as standard.
Adaptable to any exterior design.
Screen slot is air and dust tight by special device.
Screens slide up flat, for storage any time.
Any desired sash division.
Meeting-rail; special passing-weatherstrip.
Screens leave plenty of space for blinds, awnings, etc.
Triple guard at sill; cannot leak.

Type of Unit Window That Permits Raising Window Sash Until It Disappears in the Wall, Thus Giving 100 Per Cent. Opening

lar, or other form. Bathroom windows should also be placed high, for privacy, and should have either frosted panes or stained glass. Bedrooms should have windows on opposite sides of the walls if possible, to provide through and thorough ventilation. Windows in every room should reach close to the ceiling for the best results in ventilating and lighting.

Undoubtedly, a high development of scientific window-making has been attained by the unit type of window which is delivered completely assembled with glazed sash, fitted, weighted and hung, weather-stripped, screened, and all hardware attached. One such type resembles the ordinary double-hung window both in external and internal appearance when installed, but affords 100 per cent. ventilation in that the sash may be pushed clear up into a pocket or boxhead in the wall. It is made also to close perfectly tight, permitting of no air leakage and thus effecting considerable fuel saving. Metal framed screens raise like the sash into the boxhead.

These windows are more readily cleaned than the usual type, since they may be quickly washed from the inside of the room. It is no longer necessary to sit on the sill.

The window unit referred to is made in standard sizes and only the application of the inside and outside trim and the finish are needed to complete the window after the frame is set in the wall.

The development of fireproof construction has brought about the use of wire glass which may crack but will not fall away in intense heat, and of sashes either wholly of metal or of wood cased in sheet copper or sheet brass. Wire glass is rarely used for domestic purposes, but is widely and properly found in business houses, factories, schools and other places where many people congregate.

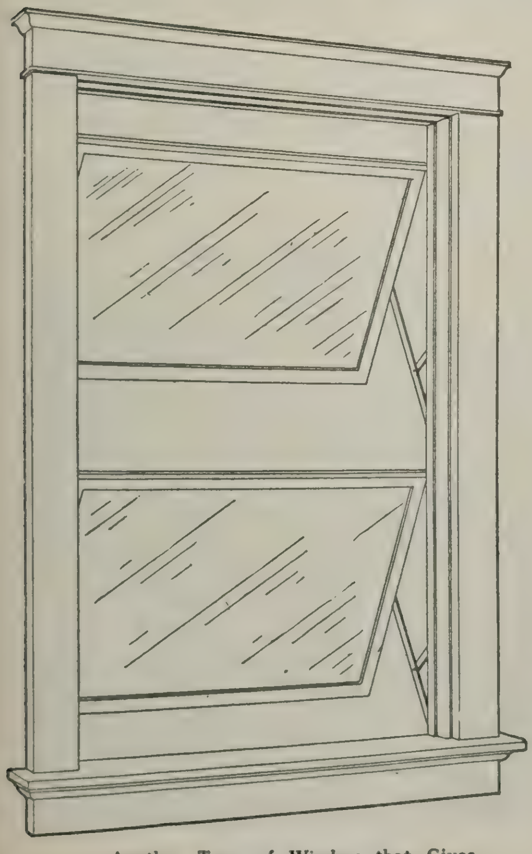
The appearance of the window from the outside can be greatly improved by the proper selection of frame casing. Suitable and attractive frames may be had in stock designs that very well serve their purpose. The window frame unites the window to the structure of the house and makes it an integral part of the building. Its duty is further to be weatherproof, keeping out moisture and drafty air currents.

Bay windows must be judiciously used, if they are not to mar the aspect of the building. Projecting as they do, they are conspicuous features of the house and should be carefully proportioned and considered. The well designed bay window must look a part of the house, grown out of it quite naturally. If it seems detached and irrelevant, like an afterthought, it is distinctly a failure architecturally. Bay windows well designed are a source of much interest, and their decorative possibilities are much in their favor.

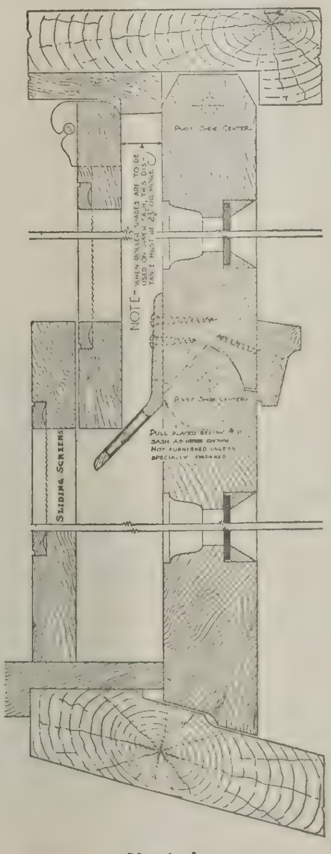
Easily Removable Window Designed to Give 100 Per Cent. Opening

Similarly, dormer windows add interest to the outside of the house by relieving monotonous expanses of roof, to say nothing of their actual utilitarian value as windows.

The window divided into small panes has more decorative interest than the single pane. Some people claim that the muntins between the small panes obstruct the view. But people today are too busy to spend much time studying the view, and the small panes seen from the outside give a sense of scale and by being kept the same size and shape throughout the house, afford a certain character and individuality to the house otherwise lacking. Small panes also make for privacy. It is possible and quite usual to have the upper part of the window glazed with small panes and the lower with an unbroken expanse of glass. This serves the same purpose and permits of enjoying the view as well.

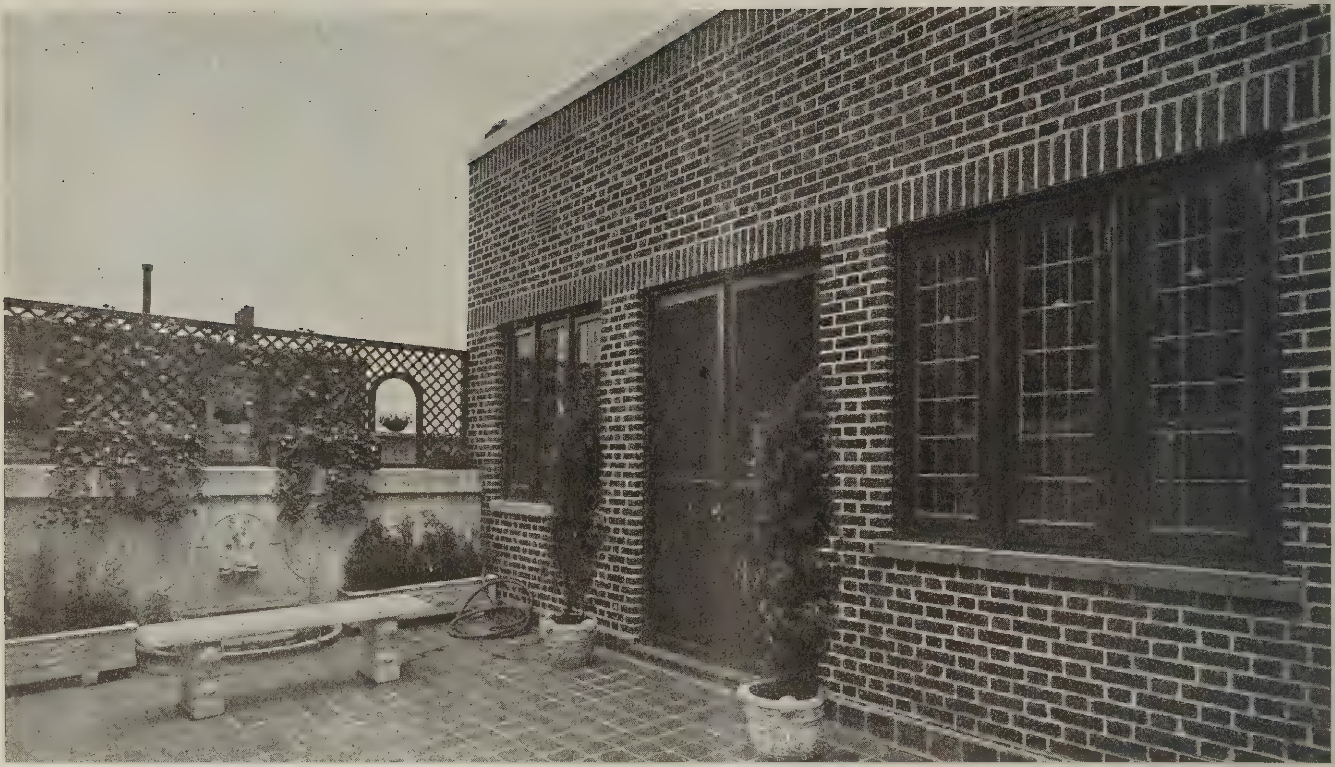


Another Type of Window that Gives 100 Per Cent. Opening



Pivot Sash Center
NOTE— When rolled shades are to be used on upper sash, this distance must be 2½" or more
Pivot Sash Center
Pull placed below top sash as here shown not furnished unless specially ordered
Sliding Screens

Vertical Section of Two-Unit Window



A CITY STUDIO ON THE ROOF OF AN OFFICE BUILDNG IN NEW YORK
Jacob Gescheidt & Company, Architects

Artistic Studios in the City

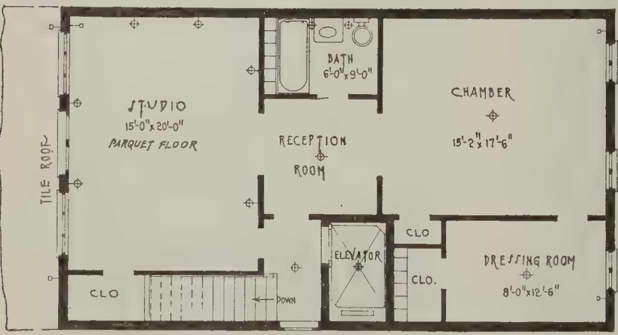
THE city studio shown here was built atop a New York office building. The artist's love for nature will not be wholly stifled in this artificial atmosphere, for he has surrounded himself by the things of nature in so far as he has been able to do so.

The fountain detail in the outer court was shown in the June issue of BUILDING AGE.

In building this studio it was necessary to lower the roof of the main building about two feet. This was done without inconveniencing the tenants of the building.

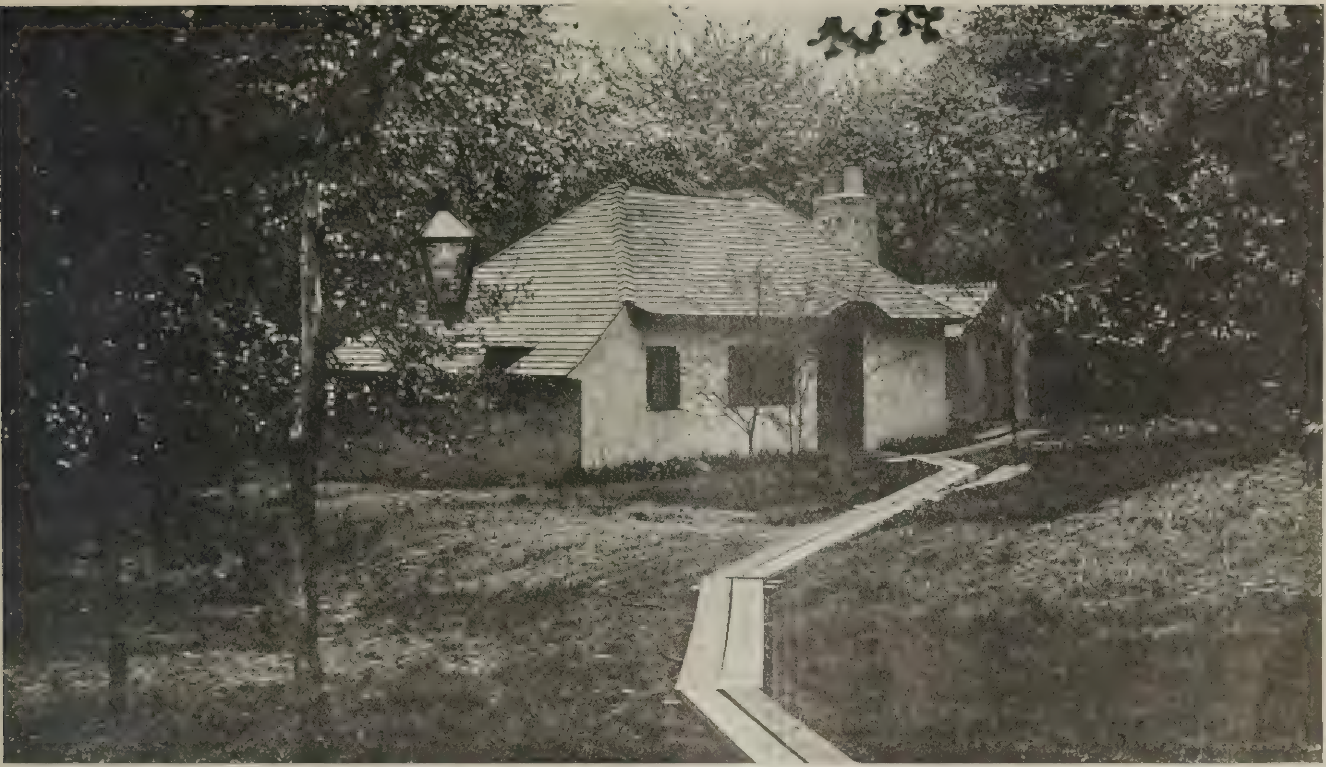
The exterior has been done in a red face brick which contrasts well with the white stucco parapet wall and cast stone features and sills. The lattice and shrubbery give just enough green to the scheme of colors to lend a country atmosphere to what would otherwise be an ordinary city studio and nothing more. The design is complete.

The plan shows a reception hall, the studio proper, a bedroom with dressing room adjoining, and a bath, and covers an area 25′-6″ by 43′-6″. The interior floors are parquet, while the floor of the exterior



Floor Plan of a City Studio
Jacob Gescheidt & Company, Architects

Fireplace Detail of a City Studio
Jacob Gescheidt & Company, Architects



STUDIO OF JACK SHERIDAN, PORT WASHINGTON, N. Y.
Frank C. Forster, Architect

and in the Country Town

court is tile. The light, heat and water is connected to the main building supply with separate meters.

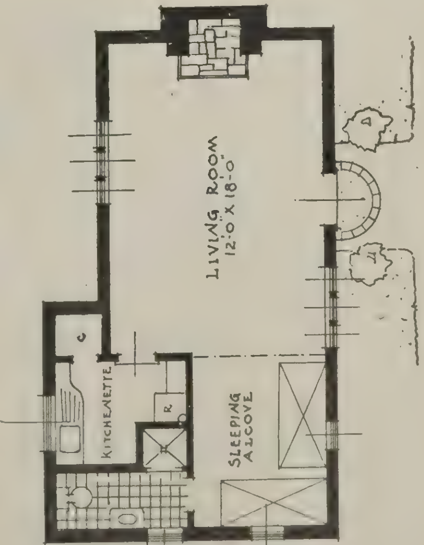
Every city offers in its office buildings many opportunities for studios of this nature, and this example presents a field for the builder that is more or less new.

Entrance Detail
Studio of Jack Sheridan

CONTRAST with this the country studio, surrounded by Nature, Herself, without adornment or artifice. Such a quiet and restful retreat must necessarily find its reflection in the artist's work. The very simplicity of the plank walk, the entrance, the studio itself is in complete harmony with its natural environment.

The treatment of the exterior is also quite in keeping with the surroundings. The rough stucco walls are further roughened with the mason's trowel. Except for door and window frames there is no trim. These studios present two excellent examples of good city and country treatment.

The plan shows an unusually large living room with open fireplace. The main entrance leads directly into the center of the room. Adjacent to this room is the sleeping alcove in one corner and kitchenette in the other corner of the house. The bath room adjoins the sleeping alcove. The simplicity of the interior plan harmonizes well with the unpretentious exterior and setting.

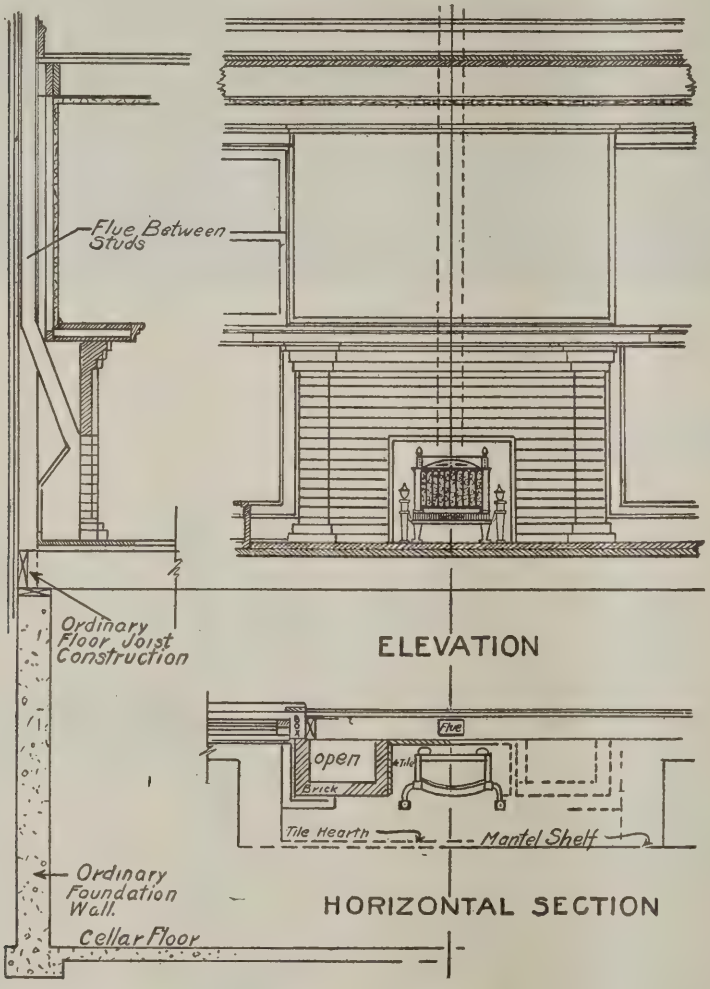


Floor Plan of the Country Studio
Frank C. Forster, Architect

Fire Place Construction Affords Field for Off-Season Work

Radiant Heat Secured by Gas—Recommended Construction for Old or New Houses

ORDINARILY house heating is accomplished by the circulation of warm air-currents. Such air has been heated either directly in a warm-air furnace or more or less indirectly by steam or hot-water radiators located in the different rooms of the house.



Recommended Construction for Gas Heater Installation
Note the flue to carry away noxious gases

Radiant heat differs from the convected heat mentioned above because it does not depend upon air currents for its heating properties. The best example of this is the heat from the sun which is transmitted in all directions through space.

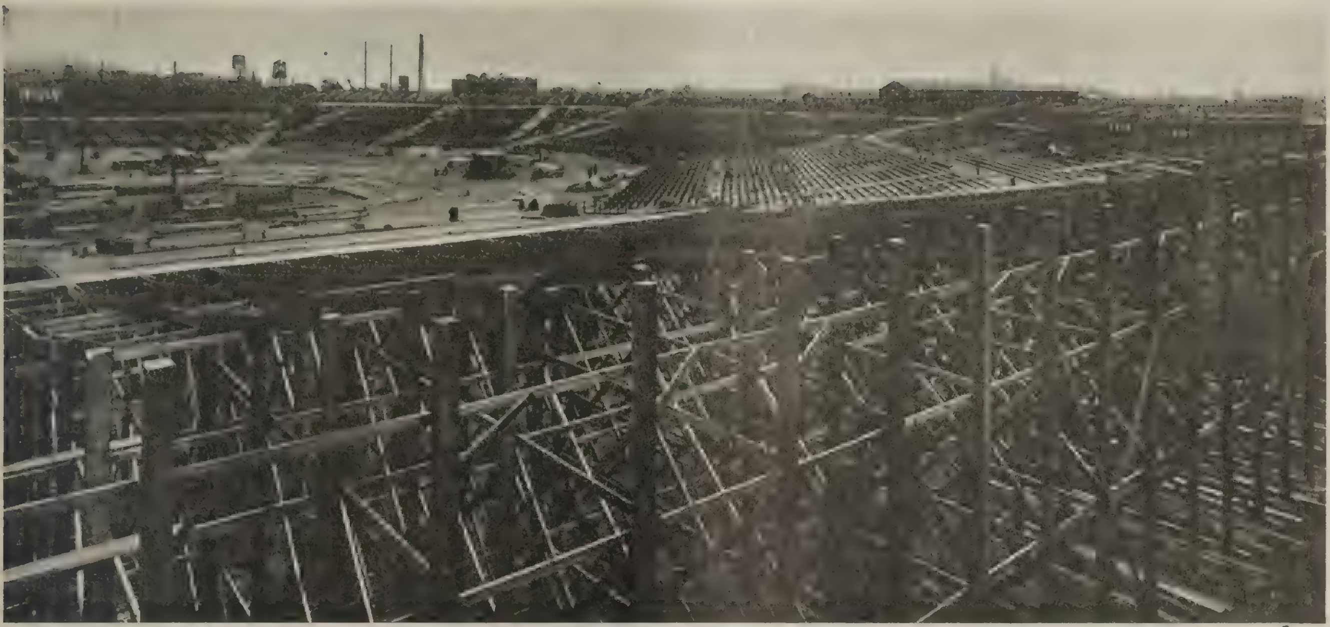
The market today offers many designs of gas heaters for heating by the radiant principle. These designs eliminate the nuisance of gas fumes in the house because they are carried away by a small flue in much the same way that smoke is carried away from the ordinary coal or wood fire.

When these heaters are located in a large open fireplace they make an attractive installation. The proper construction of such a fireplace is here illustrated and it will be noted that the layout provides for a flue. This flue is, of course, much smaller than the flue used with coal or wood fireplaces, such as shown in the June issue of BUILDING AGE, and serves the purpose of carrying away the fumes mentioned above. A slight arch above the fire reflects the heat into the room.

Such fireplaces may be built in a very economical way of brick or tile. It is unnecessary to reinforce the floor under the fireplace, since the brick or tilework need not be solid. Thus, ordinary floor joists will be sufficient to carry the weight.

The construction of this type of fireplace makes it adaptable to either old or new houses. In new work it is essential that the plumber makes proper provision for a gas conneciton. The drawings, therefore, should indicate this, when such heaters are to be used. It will not be necessary, however, to provide the usual ash cute to the cellar, as there are no ashes with this installation.

In remodeling old houses to include fireplaces this type of construction is peculiarly well fitted, because it is economical and because the ordinary house timbers are strong enough to carry the work. In other words it can be done at small cost and little annoyance. Such work offers a good field for off-season winter work and the builder will undoubtedly find the greatest demand for such work in the winter months. Even where houses are already equipped with good heating systems, gas heaters like these are often desirable, particularly in the late Fall and early Spring months to take the chill off the house or to provide heat for a cold day or two, without the necessity of starting up the main heating plant for so short a period. The gas heater is, therefore, a desirable addition to any good heating system.



View of Dempsey-Carpentier Fight Arena, Showing Framing Construction
Edwards Construction Company, Jersey City, N. J., Builders

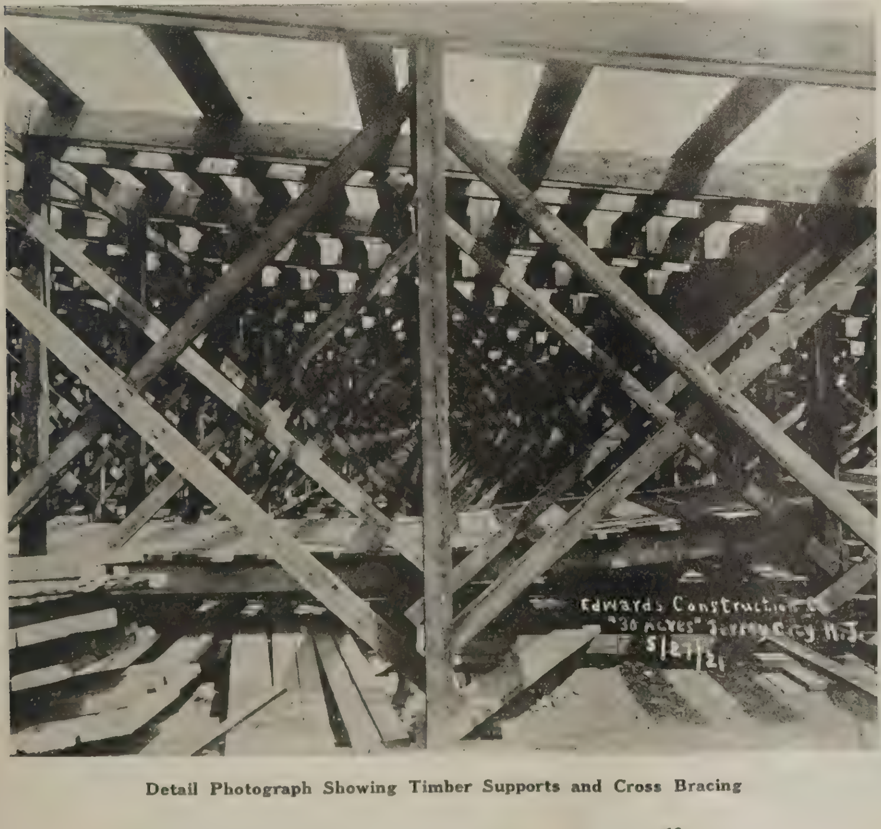
Construction of Arena Where Dempsey and Carpentier Fought

THE monster amphitheatre in which the Dempsey-Carpentier fight took place in Jersey City, N. J., on July 2, is the largest wooden open-air arena ever built. It covers seven and half acres and seats 91,613 people. The plan is octagon in shape and measures 650 ft. in diameter. Before construction work took place, 60,000 cu. yds. of earth were excavated. About 2,250,000 ft. of lumber were used. The total cost was about $300,000.

Construction is of standard mill type, the outer wall in elevation being 38 ft. high; the seats slope down toward the ring so that each spectator has a good view.

The posts used were 6″x6″ up to 26′ in length, and 8″x8″ from 28′ to 38′ in length, all long leaf yellow pine. Canadian spruce and yellow pine planks 2x10″ 22′ were used for double stringers, and 2x6″ spruce for bracing. Most of the material used, was 2″ planks of yellow pine and spruce, which form the seating and siding. Under each post was 16 square feet of planks, and to build these footings it took 250,000 feet of oak lumber. The flooring or running boards in front of each row of seats were built of 2x12″ long leaf yellow pine planks, amply supported by posts and braces.

There were eight main entrances so arranged that it was possible to empty the arena in less than ten minutes in the event of an emergency.



Detail Photograph Showing Timber Supports and Cross Bracing

Outdoor Painting

Protective Coatings for Steelwork and Concrete—Pointers on House Painting

THE desired results on an exterior painting job are only to be had if a thoughtful attitude is brought to bear upon the work. There are certain things that need to be known before one may proceed, and knowing which, success is comparatively sure.

Paint is for the preservation and decoration of surfaces.

There are several bases for oil paint, the most commonly used for building work being white lead, red lead, zinc white and oxide of iron. White lead is the most used, as it has greater covering properties and is more durable than other bases. It is particularly recommended for outside painting.

The particles of the base are held in suspension in linseed oil, thus permitting of a thin coat of paint, uniform in color and consistency. In drying this forms a kind of skin over the surface to which it is applied.

Turpentine is used as a solvent or thinner to bring the paint to a proper consistency so as to allow it to be spread in a thin, even coat. Driers are often added to hasten the process of drying the oil.

Surface Should Be Dry

Whatever the nature of the surface to which paint is applied, it should be perfectly dry. Wood especially, even when apparently dry, may contain a large amount of moisture. When applied to such a surface, paint prevents the moisture from escaping until a warm sun converts it into vapor. This raises the paint and causes it to blister.

The first coat of paint is called the priming coat, and usually consists of red lead and linseed oil. Such a priming not only dries quickly itself but also accelerates the drying of the next coat. The first coat should be thoroughly dry before the next is put on. Before the first coat is applied, to wood, all holes should be filled with putty.

There is no advantage in applying the paint too thickly. A thick film takes longer to dry than two thin films of the same total thickness.

In steel work, the paint used should resist or prevent rust and not hasten its development. The graphites and carbons are among rust-inducing paints, while pigments made from lead, zinc, good grades of iron oxide, whiting, asbestine and china clay are rust retarding, and may be properly used in priming coats of steel.

In concrete painting, the conditions are different. The ordinary types of linseed oil paint have been found to peel off of concrete, due to the fact that concrete in setting liberates free lime and when this lime rises to the surface it affects the oil in the paint and thus destroys the binder. The priming coat for concrete must therefore be composed of a material that the lime in the concrete will not affect.

No paint or other finishing material should be applied in damp weather. The interior plaster work of a new structure should be thoroughly dry before paint is applied to the exterior, else blisters will be formed when it does dry. If the wood has already been painted, all old, loose paint should be removed with a wire brush. If the wood has not been previously painted, all knots and sap streaks should be coated with turpentine not more than an hour before putting on the priming coat.

Qualities of Protective Paint

Good protective paint has certain requisites. It should form a hard, adherent foundation for subsequent coats. Nothing tends to crack paint more quickly than the attempt to apply hard coats over soft coats.

It should also be a non-conductor of electricity, to prevent electrolytic action. In these days when electric wires run everywhere, under street and overhead, the leakage of electric currents is an everyday problem and should be guarded against. It should contain no compounds soluble in water, or it can be no protection against water. Each succeeding coat of protective paint should be of a different color, so that an inspector may detect slighted parts.

Selection of Colors

In selecting colors for the exterior painting of the house, its style and size should be considered as well as its location and surroundings. A house closely set among trees or shrubbery should not be painted green or olive, as they inevitably clash. A contrasting red is much to be preferred. Usually such houses look well if painted white or cream, with red or possibly green roofs. How effective this is will be readily realized when one recalls the fine old Colonial houses nestled among tall elms. These Colonial houses were almost always white with green shutters.

Houses that are more exposed to view may be painted in brighter, warmer colors to make up for their isolation. Small houses should be painted in light colors to increase their apparent size, and add something of dignity. Houses that are tall and narrow, with irregular gables, may be foreshortened by painting the gables a darker color than the rest of the house. Window sashes, shutters and trim add to the richness if they are painted a deeper, darker color than the body of the building.

White, of course, is not desirable in smoky localities or factory towns, but a light gray or tan would be appropriate and serviceable.

Due regard should be had for the color of neighboring houses. Much good effect can be obtained with a little consideration in this direction instead of an indifference which tends to mar the whole outlook.

What Makes Successful Buildings?

SUCCESSFUL buildings are not the result of chance. They are the product of ideas and practices that the experience of successful builders has evolved after years of thought and study. That is why the best builders are always studying the methods of the other fellow and improving them where they can.

The Hanger operates on a swivel and turns on the track without sticking or binding in any way

The No. 27 Latch has no complicated parts to get out of order

Prepare Now to get your share of this business

The season for building activity will soon be on

MORE CARS MEAN MORE GARAGES
MORE GARAGES MEAN MORE HARDWARE

NATIONAL

Nos. 805 and 806 Garage Door Sets

Will uphold your reputation for high class work

They provide for free and easy access to garage at all times because one door is so hung that it will open without disturbing the other two doors. Doors are adjustable in case of swelling or raising of cement floor. There is absolutely no binding or friction. Doors hung with these sets require but a minimum of space in opening, as they are hung in the inside and fold and slide against inner wall. It is the most economical and efficient set you can offer your customer.

Ask for Garage Plan Booklet F and give dealer's name

NATIONAL MANUFACTURING COMPANY
Sterling Illinois

New Catalogs and Publications

584. Allmetal Weatherstrip Co., 122 W. Kinzie St., Chicago, will supply samples and price list to every builder who wants to increase his profits.

585. Convertible Levels. Be a Bigger Builder. A. S. Aloe Co., 622 Olive St., St. Louis, Mo., have issued a book for free distribution among builders with reference to the Aloe Convertible Level, an instrument with unique usefulness.

586. In-Lade Design. Roofing will prove its worth to builders who will send for samples and information to the Amalgamated Roofing Co., 431 S. Dearborn St., Chicago.

587. Mixers and Hoists. The Nation's Price-Maker is the useful book sent on request to builders by the American Cement Machine Co., Keokuk, Iowa. It gives complete data on Boss Mixers and Boss Hoists and will interest builders engaged in "heavy duty" work.

588. Manual of Face Brick Construction. Every builder and every prospective home owner should write to Dept. B6 of the American Face Brick Association, 110 S. Dearborn St., Chicago, for their excellent and valuable Manual of Face Brick Construction. Diagrams and photographs illustrate methods and results.

589. Concrete Mixers. Save the work of three men by writing to the Archer Iron Works, 2442 W. 34th Place, Chicago, for their catalogue on Archer End Discharge Mixers. It is worth consideration.

590. Arkansas Soft Pine. Technical literature, together with finished samples, may be had from the Arkansas Soft Pine Bureau, Boyle Bldg., Little Rock, Ark., by mentioning Building Age. This literature will be of particular use to the builder of homes, apartments and semi-public buildings, and should be in the hands of every builder in the field.

591. Elastica. The "Ideal Exterior Wall Covering," as Elastica is called, gives proof of its claims as waterproof, stainproof, fireproof and crackproof, in the interesting and informing literature issued to builders by the American Materials Co. Write them at 101 Park Ave., New York, and be sure to mention Building Age.

592. Asbestos Shingles. No builder should be without the literature and samples of the Ambler Asbestos Shingles. Their fine color effects are but one of many qualities to commend them. Write us to send these to you.

593. Woodworking Machinery. W. F. & John Barnes Co., 71 Ruby St., Rockford, Ill., have a catalogue waiting for readers of Building Age, that will tell carpenters and builders how to do more work with less work. It refers particularly to hand-power-foot wood-working machinery.

These catalogs may be secured direct from the manufacturer. If you prefer, write the date of this issue and the numbers of any catalogs on a postal and mail it to "Building Age," 912-920 Broadway, New York City. The catalogs will be sent you without charge or obligation.

594. Floor Surfaces. Wayvell Chappell Co., 137-143 No. Jackson St., Waukegan, Ill., have an automatic ball bearing electric floor surfacing machine equipped to give unusual service. Write to their Department O for details.

595. Fireproof Doors. A. C. Chesley Co., 275 Rider Ave., New York, will send booklets on their stock fireproof doors. These come in standard sizes, with frames and trim.

596. Study at Home and make more by addressing the Chicago Technical College at 638 Chicago Tech Bldg., Chicago. They will send you most valuable information as to improving every opportunity and at low cost increase your efficiency in every department of building. Don't miss this chance.

597. Champion Mortiser. Let the Colgan Machinery & Supply Co., 701 Hayden Bldg., Columbus, Ohio, tell you about the Champion Mortiser. Every builder wants to save time, labor and material. This is one of the ways.

598. The Compo-Board Co., Lyndale Ave. No. at 44th, Minneapolis, Minn., will send samples and interesting booklet on this type of wall board. It has many qualities to commend it—qualities that builders demand and appreciate.

599. The Concrete Block Machinery Assn., Rock Rapids, Iowa, will help builders to get better service and better prices if they take their plans to their local concrete products factory and outline their requirements of block, brick and tile. Write them as a reader of Building Age, or send us for details.

600. Diamond Metal Weatherstrip Co., Diamond Bldg., Columbus, Ohio, has information of interest to builders who mention Building Age.

601. Hot Water Service. Write the Economy Heater Co., 108 So. La Salle St., Chicago, for description of a reasonably priced equipment which renders instant and continuous hot water service.

602. Metal Ceilings. A large catalogue showing a full line of embossed metal ceilings and walls may be had from the Edwards Mfg. Co., 423-443 Eggleston Ave., Cincinnati, Ohio.

603. Reliable Scaffold Brackets, durable, compact and, of course, safe, may be thoroughly investigated by writing the Elite Mfg. Co., Ashland, Ohio, and mentioning Building Age.

604. Hinges. Griffin Mfg. Co., 45 Warren St., New York, will send illustrated catalogue and circulars on hinges and door butts.

605. Pipeless Furnaces. Globe Stove & Range Co., Dept. N-6, Kokomo, Ind., has instructive information for the competent builder. Ask about their pipeless furnaces.

606. Roofing. Help business in the dull season by writing the Heppes Roofing Division, Richardson Co., 516 Fifth Ave., New York, how to lay new roofs over old.

607. Furnaces. Free illustrated booklets on Hess Welded Steel Furnaces, pipe and pipeless, should be obtained from the Hess Warming & Ventilating Co., 1201 F, Tacoma Bldg., Chicago, Save coal for your clients.

608. Concrete Mixers Yaeger Machine Co., 216 Dublin Ave., Columbus, Ohio, has issued a new price list of interest to builders who need concrete and mortar mixers.

609. Boxing Machine. R. E. Kidder Co., 35 Hermon St., Worcester, Mass., may be addressed with reference to an improved boring machine of unusual construction.

610. Elevators. Kimball Bros. Co., 1106 9th St., Council Bluffs, Iowa, show how to change hand power elevators and dumbwaiters to electrically operated ones. Write for information.

611. Concrete Mixers. Dandie Catalogue No. D-4 should be in the hands of every large builder and contractor. Write the Koehring Co., Milwaukee, Wis.

612. Long Bell Lumber Co., Kansas City, Mo., will send interesting particulars for builders who mention Building Age.

613. McCray Refrigerator Co., 2164 Lake St., Kendallville, Ind., is in position to offer unusual service and co-operation to builders both as to plan-drawing and specifications together with valuable information on the science and art of refrigeration. Write for catalogues.

614. Herringbone Wall Ties. For strength and utility, inquire about Herringbone Wall Ties. Write Merwin Mfg. Co., Erie, Pa., mentioning Building Age.

615. Morgan Woodwork. Let us send you the free prospectus of the Morgan Sash & Door Co., which no

The Business Side of Hinges

THE executive sits alone with his thoughts. A thousand others in the same building work in like manner—each unconscious of the other. Distance is made a matter of desire—determined by open or closed doors. Adjoining offices and business neighbors are as near or as far as convenience demands. In planning office buildings the architect and the builder strive to make quiet possible.

Doors make the executive's office a stronghold or a forum for business discussion. And hinges make doors possible. In the Anti-Friction Butt, McKinney offers a hinge that lends both beauty and durability. These butts vanquish noise and serve without a murmur.

McKinney Anti-Friction Butts are equipped at the joints with washers made of special process anti-friction metal which is self lubricating. Every day on millions of doors—in office buildings and homes—they prove their worth by work effectively done in silence. Other McKinney Hinges have been designed with equal thought to combine true craftsmanship with every-day usefulness.

Architects and Builders will also be interested in McKinney Complete Garage Sets. These sets contain all the hardware necessary for swinging, sliding-folding and "around-the-corner" types of doors. An illustrated booklet on these sets and the McKinney catalog will be sent upon request.

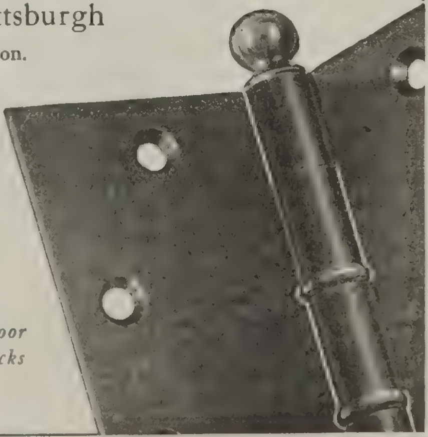
McKINNEY MANUFACTURING CO., Pittsburgh

Western Office, Wrigley Bldg., Chicago. Export Representation.

MCKINNEY

Hinges and Butts

Also manufacturers of McKinney garage and farm building door hardware, furniture hardware and McKinney One-Man Trucks



builder or prospective home owner can afford to be without. It tells how to build with assurance.

616. Hay Tools. F. E. Myers & Bro., Ashland, Ohio, have new price list which builders should send for on the subject of Myers' Hay Tools.

617. Carpenters' Tools. Remarkable stories of service in carpenters' tools may be had free from Mack & Co., Brown's Race and Platt St., Rochester, N. Y. Send for Carpenter's Catalog.

618. The Natco Double Shell Booklet for homes and garages should be obtained from the National Fire Proofing Co., 955 Fulton Bldg., Pittsburgh, Pa. Send for it.

619. A garage plan booklet "F" may be had from the National Mfg. Co., Sterling, Ill. Every builder of garages will want it.

620. Metal Shingles. Full size samples and prices on metal shingles may be had from the National Sheet Metal Roofing Co., 339-345 Grand St., Jersey City, N. J.

621. Kno-Burn. Information on cost-saving construction together with samples of "Kno-Burn" should be in the hands of every builder. Write the North Western Expanded Metal Co., 904 Old Colony Bldg., Chicago.

622. Redwood. Builders who want to know about residential building materials should write to the Pacific Lumber Co., at 2070 McCormick Bldg., Chicago, for valuable information.

623. Woodworking Machines. Builders will be interested in the catalogue of the Parks' Ball Bearing Machine Co., Station A, Cincinnati, Ohio, which gives the essentials of good woodworking machinery.

624. Heaters. Details on the Rybolt Heater of value to builders may be had from the Rybolt Heater Co., Ashland, Ohio.

625. Slate Roofs. Sheldon Slate Roofs have stood the test of time and builders should inquire for details and further information. Write F. C. Sheldon Slate Co., Granville, N. Y.

626. Mixers. Stewart Mfg. Co., 366 Rath St., Waterloo, Ia., will send interesting details on Stewart mixers by request.

627. Wallboard. Get more business in your town by addressing the U. S. Gypsum Co., Dept. H, 205 West Monroe St., Chicago. This is an opportunity.

628. Ventilators. A catalogue on rotary exhaust ventilators, weather vanes, etc., is available for builders who address E. G. Washburne & Co., 208 Fulton St., New York.

629. Lumber. Weyerhaeuser Forest Products, St. Paul, Minn., has available specific and unusually valuable information as to proper uses for lumber, for the alert builder. There is real service here.

630. Convertible Level. David White Co., 907-915 Chestnut St., Milwaukee, Wis., will send circular on the White Convertible Level for shrewd contractors.

631. Roofing. The Wheeling Corrugating Co., Wheeling, W. Va., has a product that builders should investigate. The tin plate roof offers wearing qualities, economy in cost, and other features that peculiarly commend it. Send for literature.

632. Blue Print Machine. The details of the Wickes Blue Print Machine should be obtained by careful builders from Wickes Bros., 1301 Water St, Saginaw, Mich.

633. California Redwood. Complete information, prices and specifications on the subject of California Redwood may be had by addressing this office by mail.

634. Portable Saw Rigs. Saw rigs, hoists, elevators, mortar mixers and pumps may be learned about in the catalogue of the C. H. & E. Mfg. Co., 259 Mineral St., Milwaukee, Wis.

635. Tackle Blocks. This topic is fully illustrated in the Catalogue No. 5 of the Union Hardware Co., Torrington, Conn.

636. Woodworking Machinery. Bulletin 77 and the "American" catalogue may be had from the American Saw Mill Machinery Co., 62 Main St., Hackettstown, N. J., which literature illustrates a full line of woodworking machinery.

637. Decorative Concrete. Interesting information on reproducing effects of marble, granite, onyx, etc., at low cost, should be obtained from the Art Stone Co., Box 500, Waynesboro, Pa. Ask for the Aristo plan.

638. Canvas Roofing. An illustrated booklet on Roofing Facts and Figures, together with samples of "Consertex," may be had from Wm. L. Farrell Co., 50 Leonard St., N. Y.

639. Wallboard. An interesting catalogue covering wallboard uses may be had from the Black Rock Wallboard Co., 504 Ontario St., Buffalo, N. Y. Wallboard serves so many purposes that it is desirable to get everything available on this topic.

640. Sash Balances. The circular of the Caldwell Mfg. Co., 5 Jones St., Rochester, N. Y., tells how to modernize old windows at low cost, and make the mechanism unaffected by atmospheric conditions.

641. Brick. No builder or prospective owner should be without the literature of the Common Brick Industry of America, 1308 Shoefield Bldg., Cleveland, Ohio. Save brick, mortar, labor and time by inquiring about the "Ideal" wall.

642. Metal Shingles. Cortright Metal Shingles are claimed standard since 1887 as manufactured by the Cortright Metal Roofing Co., Philadelphia. Write for details.

643. Woodworking Machinery. Write to the Crescent Machine Co., 206 Main St., Leetonia, Ohio, for catalogue of machines that do 15 different kinds of work. Accuracy and convenience are assured.

644. Stained Shingles and Thatched Roofs. Everybody who sees this should at once address Creo-Dipt Co., Inc., 1030 Olive St., N. Tonawanda, N. Y., or this office for an unusually copious collection of suggestive material on small dwelling projects. Booklets, photographs, samples, working drawings and much other data will be supplied.

645. Tools. The Disston Tool Book tells about the selection, care and use of saws, tools and files. It may be had from Henry Disston & Sons, Inc., Philadelphia, Pa.

646. Screen Material. Address Dept. C of the Gilbert & Bennett Mfg. Co., New York, for samples and literature on portable or permanent, stationary or movable screen needs.

647. Handy-Man Book. A valuable 256-page book of greatest interest to the builder and contractor and all those engaged in building, is obtained from Hardin-Lavin Co., 4538 Cottage Grove Ave., Chicago. Contains hundreds of floor plans, elevations, diagrams, designs, mechanical kinks, short cuts, and other suggestive material.

648. Dumbwaiters, Complete, Ready to Install. Write for catalogue to Highwood Dumbwaiter Co., Park Ave., Leonia, N. J.

649. Locker and Medicine Cabinets, steel, sanitary, for every bathroom, are described in an illustrated circular by Hess Co., 1201-L Tacoma Bldg., Chicago, Ill.

650. Dampjroofing Paint for concrete or brick is made by the Hydrex Corp., 50 Broad St., New York. Samples on request together with description.

651. Builders' Hardware, windows and door specialties are described in an illustrat ed folder issued by the H. B. Ives Co., New Haven, Conn.

652. Tool Cases. A new tool chest catalogue may be had from C. E. Jennings & Co., 71 Murray St., New York.

653. Measuring Tapes and a record of their prices appear in the recent literature of Keuffel & Esser Co., 127 Fulton St., New York.

654. Air Valves, of high grade, are distributed by Monash Younker Co., 112 W 42d St., New York. Literature available.

655. Tools. The Yankee tool book will be of interest to progressive builders. Write to North Bros. Mfg. Co., Lehigh Ave., Philadelphia, Pa.

656. National Lead Co. offers free painting helps to all those interested. These are valuable articles which layman and painter alike will find useful.

657. Auto Trailer. Catalog A of the Rogers Brothers Company, Albion, Pa., tells about all-steel auto trailers of every type from one to ten-ton capacity. Extension tongue permits of carrying lumber, poles, ladders, etc.

0.5 Arch.
B

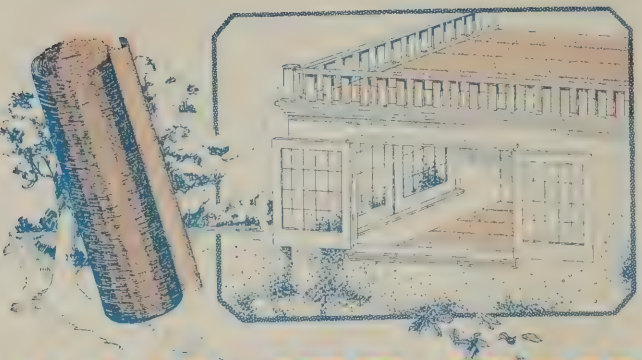
AUGUST 1921

Building Age

UNIVERSITY OF ILLINOIS LIBRARY
AUG 9 1921

43RD Year

25 Cents



CON-SER-TEX
CANVAS ROOFING

THE IDEAL ROOFING

FOR Porch Floors, Sun Parlors, Sleeping Balconies, and all flat surfaces,

Wherever a durable flashing or a lining for a wood box gutter is required—

Wherever an economical, durable, attractive covering is needed—

Con-ser-tex Canvas Roofing will give satisfaction. It's a chemically treated heavy cotton fabric which will not crack, stretch, shrink, curl or peel. It's easy to lay and profitable.

Our Free Booklet, "Roofing Facts and Figures," illustrates and explains the many uses and advantages of Con-ser-tex.

WILLIAM L. BARRELL CO. of N. Y., Inc.
50 Leonard Street New York City

Chicago Distributors:
Geo. B. Carpenter & Co.
430-440 North Wells St.

California Distributors:
Waterhouse-Wilcox Co.
San Francisco & Los Angeles

FLOORS
The Wood-Mosaic Kind

For every home—Old or New. Can be installed by your mechanics. Our 5/16″ flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood Carpet, strips Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalogue in natural wood colors.

Wood-Mosaic Company
New Albany, Indiana

Fiberlic
Wall
Board

The *material* from which it is made, the fact that the pulp is *chemically cleansed* and that the *fibre lengths* give the finished product that *natural reinforcement* that is lacking in ground wood boards, is in itself a guarantee of the superiority of Fiberlic for *strong, permanent, economical* and *sanitary construction.*

MacAndrews & Forbes Company
200 Fifth Avenue, New York City
Factory: Camden, N. J.

BUILDING AGE

NEW YORK, AUGUST, 1921

Comfortable Little Homes Built for Less Than $10,000

By W. S. MOORE, Architect

MOST people who have not thought much about it would, if asked offhand, express the opinion that the average house had best be built upon a level lot. That a plot sloping either to the front or rear has certain well defined advantages is not generally realized, especially by the layman.

Sloping lots give more light and air to the basement, there is a direct cellar outside entrance, there is less danger of dampness, a garage can more easily be built in, etc. There is also a saving in excavation. As far as the exterior goes, lots can be graded and terraced to often secure a better effect than is possible with a level lot. As most of the houses in this article were built on sloping lots, this point is worth remembering in looking at them.

In planning the small house, the tendency is to eliminate entrance halls, pantries, and similar features that contribute little or nothing to the livability of a house while adding to the cost. Far better is it to add this extra space to increase the size of the main room if the space can be afforded, or to eliminate it altogether if cost must be kept to the lowest possible figure.

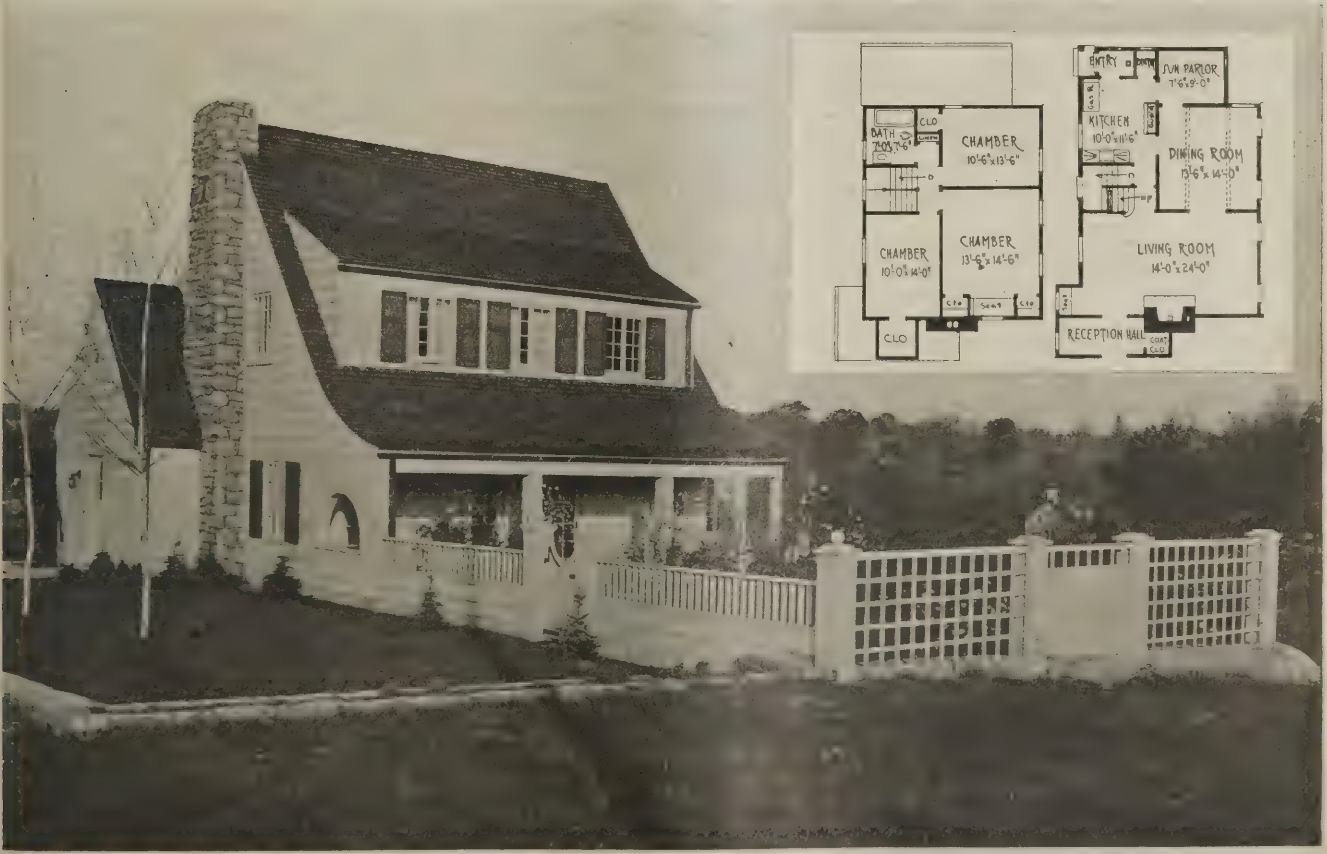


Fig. 1. An Unusually Beautiful House Made Still More Attractive by the Garden Fence and Careful Attention to Details

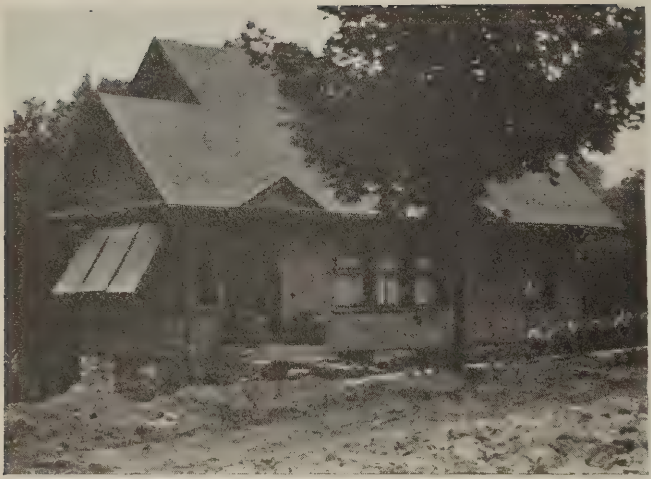


Fig. 2. The Lot Slopes Down from the Street Giving Light Basement

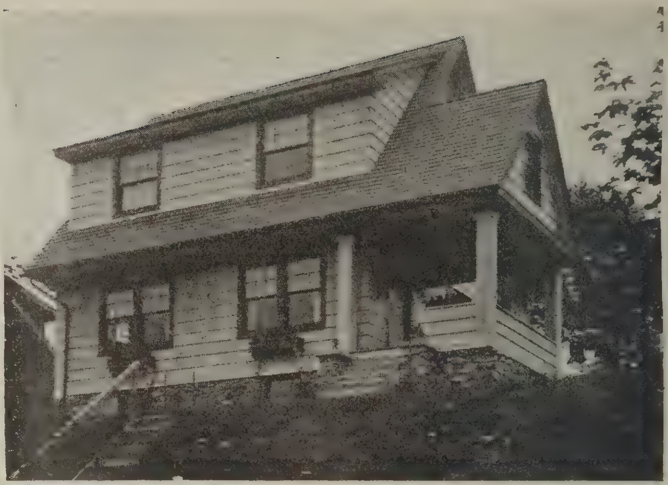
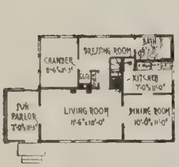
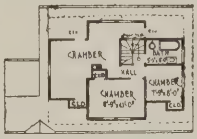


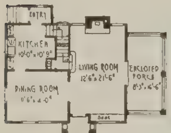
Fig. 3. A Lot Like This Always Gives a Dry Basement

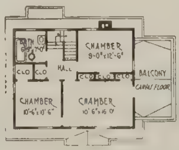




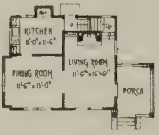
The same considerations of economy hold true on the exterior, for considerations of cost make it essential that design costing money must be avoided. It is entirely possible to design a house in which every feature shall be built as cheaply as possible, and yet be so handled as to give an appearance of quiet dignity and homelike comfort.

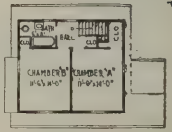
That end is gained by care in the proportioning of the body of the house and the proper scaling of the windows. If the structure be properly proportioned and the windows properly placed, the house is sure to present a good appearance.



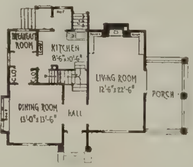


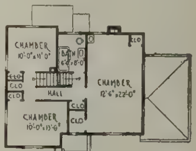
Nowhere in the architectural field must so much attention be paid to details as in the small house. Figs. 6 and 7 illustrate this clearly. Both these houses were built from the same set of plans, but No. 7 was constructed under the personal supervision of the architect. Notice how the spacing of clapboards, the shutters, the contrasting paint used for the window trim, the lattice, flower boxes and the gate at the right give the one design a beauty that is lacking in the other. Furthermore, note how in Fig. 6 there is too much space above and below the dormer windows, giving this part of the house an appearance of too great height—a fault that is entirely lacking in Fig. 7. Again, the dark green flower box in dormer of Fig. 7 gives a distinctive touch that is entirely lacking in the white painted one in Fig 6. Other little differences will be noticed at the points marked with a cross.





Both these houses cost the same to build. Extras in the shape of a gate, lattice and flower boxes come to less than $100 in Fig. 7, yet this house would readily sell for $500 more than the one in Fig. 6, and more important still, it would sell





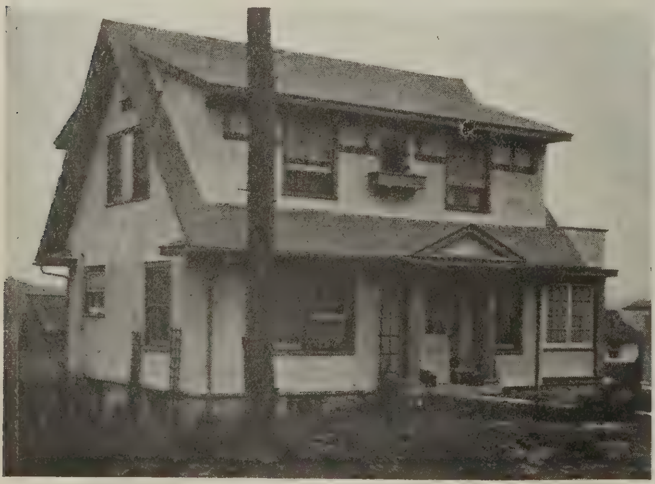


Fig. 4. An Inexpensive Type of House That Is Sure to Please

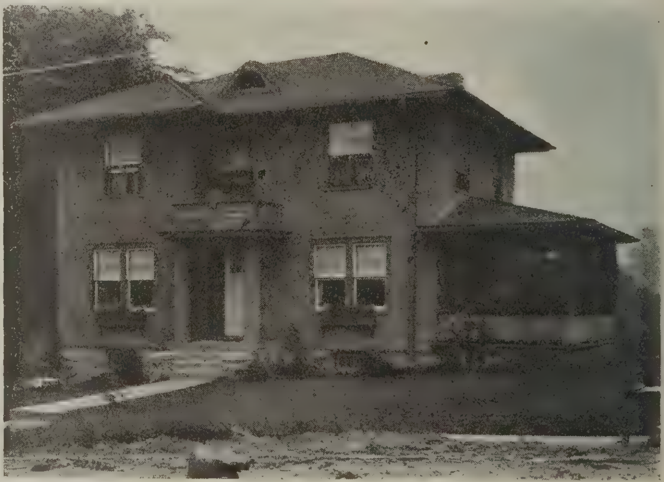
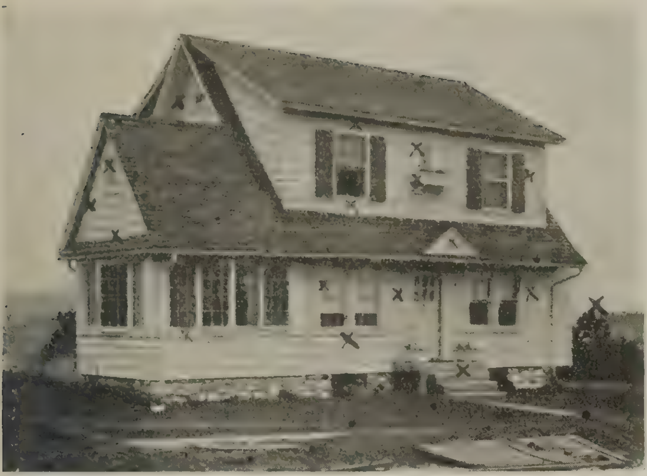
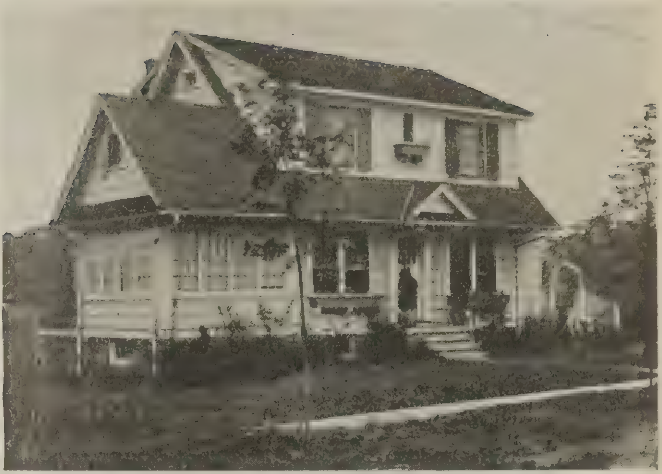


Fig. 5. A Dignified House That Looks Well in Any Setting

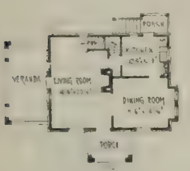


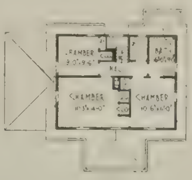


Figs. 6 and 7. These Two Houses Were Built from the Same Drawings by Different Builders, Yet How Different Is Their Appearance! Compare the Parts Marked with a Cross, Which Plainly Show the Defects in Fig. 6. Also Note the Different Spacing of the Clapboards, Which Helps to Give an Awkward Effect to the Dormer in Fig. 6

much easier. The differences in these two houses are well worth studying, for from them the builder can learn much.

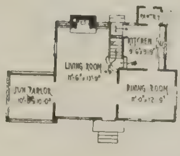
In Fig. 1 is shown another example of how a little extra in the shape of a fence will help give a touch of individuality that catches the eye. The exterior entrance, the fence, and the porch treatment add but little to the cost of the house, yet how much do they add to its attractiveness!

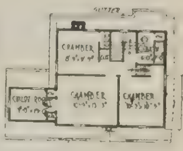




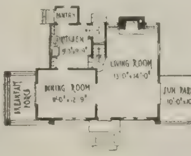
An interesting contrast of materials is shown in Fig. 8. Here a dark green asphalt shingle was used for the roof and walls of the dormer. Most attractively does it contrast with the red of the rough brick. Unusual treatments like this, if properly carried out, always attract the eye of the possible buyer.

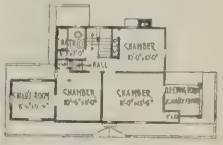
In Fig. 2 is shown a plan that makes practically a private apartment on the first floor. This arrangement is ideal for a young married couple whose parents live with them. The arrangement of the chambers on the second story was in accordance with a whim of the owner, but possesses certain advantages in furnishing the odd-shaped one.





These houses were all built at Crestwood, New York, W. S. Moore being the architect.





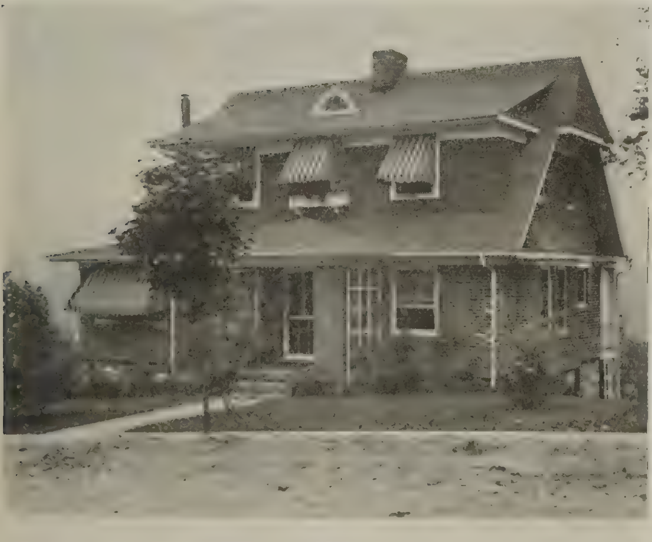


Fig. 8. Dark Green Asphalt Shingles Are Used for the Roof and Dormer Walls, Rough Texture Brick for the First Story Walls.

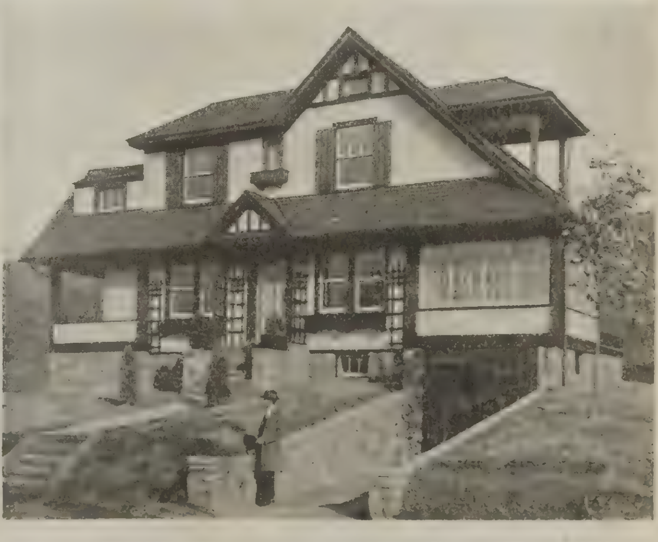


Fig. 9. An English Type House Showing How a Garage Can Readily Be Incorporated in a House on This Kind of a Lot

Here's a Builder Who Gets Big Jobs—and Tells How He Does it

Why Clients Come to Him Instead of to the Other Fellow—Publicity Methods That Have Built Up His Business

By W. P. ANDERSON
President, The Ferro-Concrete Construction Company

EVEN in dull times there is a certain amount of building always going ahead. Reports show that during June $227,710,900 worth of contracts were awarded in twenty-eight states through the country. In connection with this fact the builder is naturally asking himself two questions: "Who is getting this business?" and, "How is he getting it?"

I think we may say without fear of successful contradiction that building contracts today are going to the contractors and builders who are keeping their names before the building public in a way that is interesting, convincing and stimulative. When Mr. Blank thinks of putting up a new store, he immediately recalls that Smith Brothers put up an economical job for another business concern in his town. They had already sent him pictures of it and he saw it in the newspapers. Other builders probably put up some good work, too, but they didn't tell him about it, so Smith Brothers get the job.

How did they do it? Let's see.

Advertising Essential to Every Business Enterprise

Advertising plays an essential part in every enterprise today. In the building industry its value and importance have proved their worth time and again. It is no longer a question of "Does advertising pay?" but, "What kind of advertising pays most?"

In telling your story to the man who may be going to build, there are many ways to choose from. All good advertisers, however, study carefully the type of people they want to reach and then select their advertising so that it will appeal strongly to these people, getting the best results for the least money spent.

To get more business and better business, you must tell the world what you can do. Our company has always believed that the best way to do this is to show facts and photographs of what you have done in the past.

The best way for me to illustrate how this may be done is to tell what we do, how we do it and what we think of the things that can be accomplished by intensive publicity. This is not intended to be a recipe for a suddenly increased volume of business through advertising, but a story of the kind of advertising that has helped us build up a successful business. No doubt some of our ideas and experience will prove beneficial to other builders and contractors.

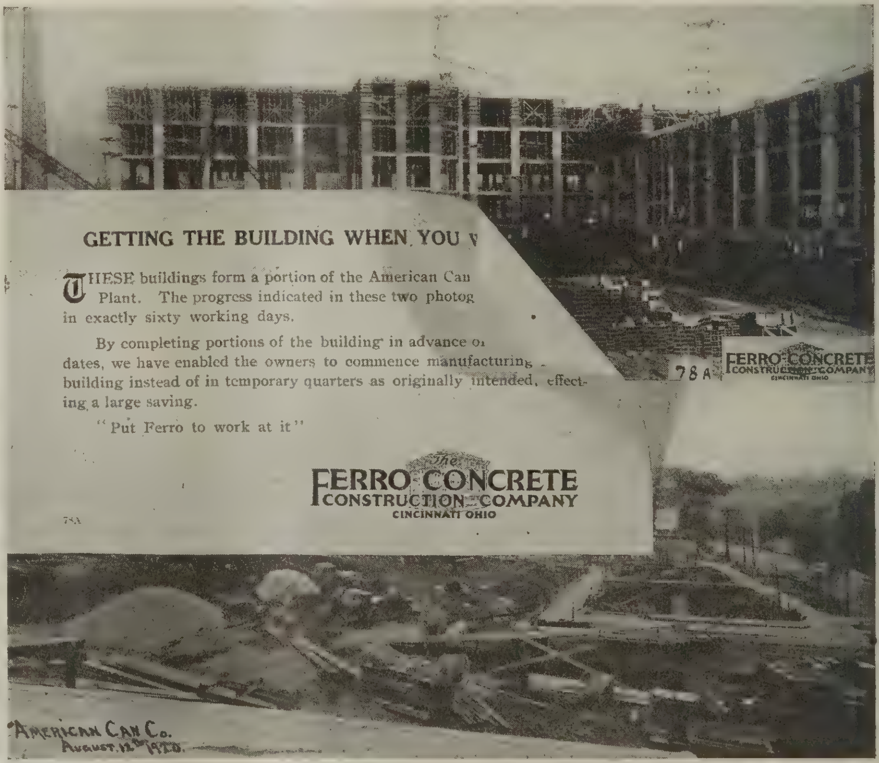
In the past we have done considerable magazine advertising. The results were not good. We came to the conclusion, therefore, that because of the character of our business and the territory covered, newspaper and direct publicity were more beneficial.

Magazine advertising, of course, builds up popular prestige, but popular prestige without the volume of business did not put dollars on the profit side of the ledger. Newspaper and direct mail publicity did. Bear in mind now that I am speaking only of getting the biggest results for the money spent and only in the building and contracting business.

Newspaper Advertising Reaches Live Prospects

Let me illustrate. In newspaper advertising your story is presented to the very persons or prospects to whom you wish to advertise. There is very little wasted circulation. If we have done considerable work in a certain city, have an organization and equipment there, or, for other reasons we feel that we are especially fitted for doing work in that city, we advertise in the local newspapers of that town, and our message reaches the people who live and do business in that town.

This kind of advertising builds up



GETTING THE BUILDING WHEN YOU

THESE buildings form a portion of the American Can Plant. The progress indicated in these two photog in exactly sixty working days.

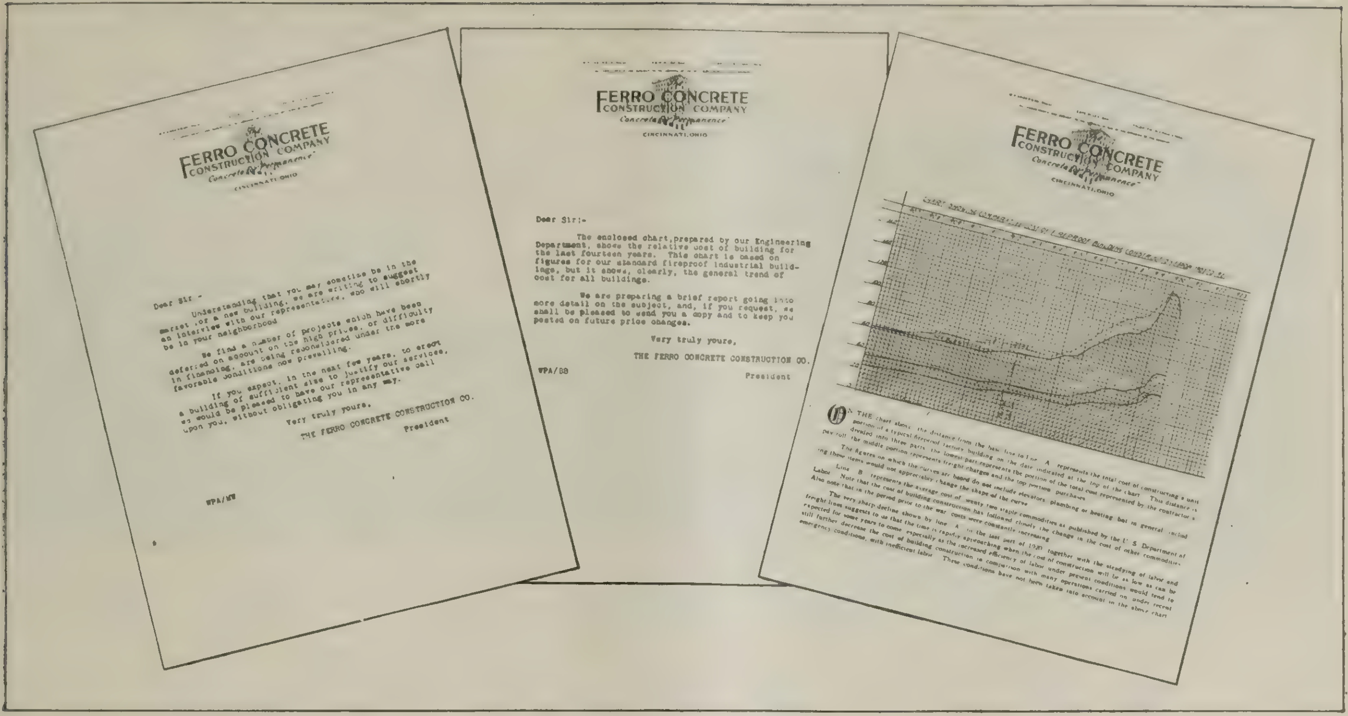
By completing portions of the building in advance o dates, we have enabled the owners to commence manufacturing building instead of in temporary quarters as originally intended, effecting a large saving.

"Put Ferro to work at it"

The FERRO CONCRETE CONSTRUCTION COMPANY
CINCINNATI OHIO

78A

One of the Photographs and Slips Used by the Ferro Concrete Construction Company. The Dates on the Upper and Lower Photos Tell the Story of Speed on the Job—from August 12 to October 21 Is Just 10 Weeks



FERRO CONCRETE
CONSTRUCTION COMPANY
Concrete for Permanence
CINCINNATI, OHIO

Dear Sir -

Understanding that you may sometime be in the market for a new building, we are writing to suggest an interview with our representative, who will shortly be in your neighborhood.

We find a number of projects which have been deferred on account of the high prices, or difficulty in financing, are being reconsidered under the more favorable conditions now prevailing.

If you expect, in the next few years, to erect a building of sufficient size to justify our services, we would be pleased to have our representative call upon you, without obligating you in any way.

Very truly yours,

THE FERRO CONCRETE CONSTRUCTION CO.

President

WPA/MW

FERRO CONCRETE
CONSTRUCTION COMPANY
Concrete for Permanence
CINCINNATI, OHIO

Dear Sir:-

The enclosed chart, prepared by our Engineering Department, shows the relative cost of building for the last fourteen years. This chart is based on figures for our standard fireproof industrial buildings, but it shows, clearly, the general trend of cost for all buildings.

We are preparing a brief report going into more detail on the subject, and, if you request, we shall be pleased to send you a copy and to keep you posted on future price changes.

Very truly yours,

THE FERRO CONCRETE CONSTRUCTION CO.

WPA/BB

President

FERRO CONCRETE
CONSTRUCTION COMPANY
Concrete for Permanence
CINCINNATI, OHIO

Some of the Letters Used by the Ferro Construction Company That Have Secured Contracts

good will and keeps the name of the Ferro-Concrete Construction Company before the public so that they know our company has facilities for doing and has already done first class work, and the kind of work they want. This kind of advertising has produced good results.

Direct Mail Advertising Best for Broad Distribution

For a broad distribution, our experience has shown that direct mail advertising gives best satisfaction. Ever since we have been in business we have circularized with letters and other printed matter, some specimens of which are illustrated here. These letters are all written on automatic typewriters.

One of the important things is the sending out of photographs of completed work. This method visualizes to the prospect actual buildings that we have done, and has proved very successful indeed. Photographs should be accompanied by a brief description and testimonial to the merit of the work accomplished. This absolutely is the best advertising you can do. It sends your message home. Results have led us to intensify this form of advertising.

We try to have the photographs we mail uniform in size and appearance. To each photograph we attach a small printed slip stating where and for whom the building was erected, and any other brief, interesting items about the construction. We find that the descriptive slip adds a touch of interest and is an important part of the story. We have found this the best advertising means that can be used by the builder, contractor or architect.

We never use the same photograph twice on the same prospect. We often follow an exterior view of a building, however, with an interior of the same building. These photographs, mailed from time to time during the year to a live prospect list, carry our message of service in a more interesting and more direct and more personal way than any other method of advertising we know. And they bring in business at small expense.

Electric Display Signs on All Work

We have another form of advertising—the motorsign. This is on the order of a magic lantern and projects the moving sign on a white surface. Our particular sign has about 150 words that can be changed as often as we wish. We place these display signs on all our work, where possible. If not we use other large signs that can be illuminated.

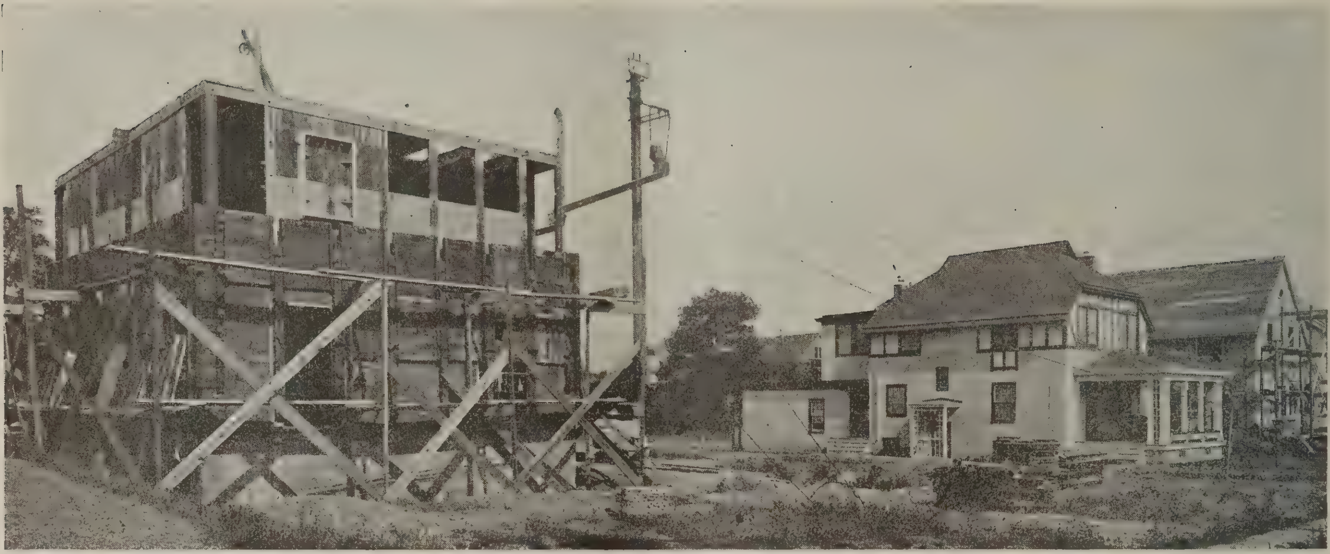
Our advertising is done in a more or less big way, but there is no doubt that any builder in the smallest towns can increase the quality and volume of his business if he will use some of the methods suggested here. Advertising is just as essential to the welfare of a small business as a large business. There is no mystery about it. All that is necessary is to place your message before your prospects in such a way as to convince them that you can do their work better than anyone else. No matter what phase of advertising a builder considers best suited to him, he should bring his name before prospective clients so continuously that they cannot think of "building" without thinking of him at the same time.

Dwelling Market

A REPRESENTATIVE of Pease & Elliman, a New York real estate firm, in discussing the private house situation, said:

"We look for a tendency to ease in prices, and when that situation really comes, we expect a very active market in small dwellings. The present condition is one in which the owner holds out for higher prices, while the homeseeker refrains from buying in the hope that lower prices will prevail in the near future.

"That there is need of a downward tendency in prices from those that prevailed during the boom last year can be seen from the fact that there is not more than a 7 to 10 per cent. difference in prices from last year. Of 100 houses we have had for sale during the past year, 95 have been held for the same price as in 1920.



House No. 4 Under Construction Showing Panel and Stud Arrangement, Metal Lumber for Joists and Manner of Placing Window Frames

Insley Equipment Pours 4 Houses at 1 Setting

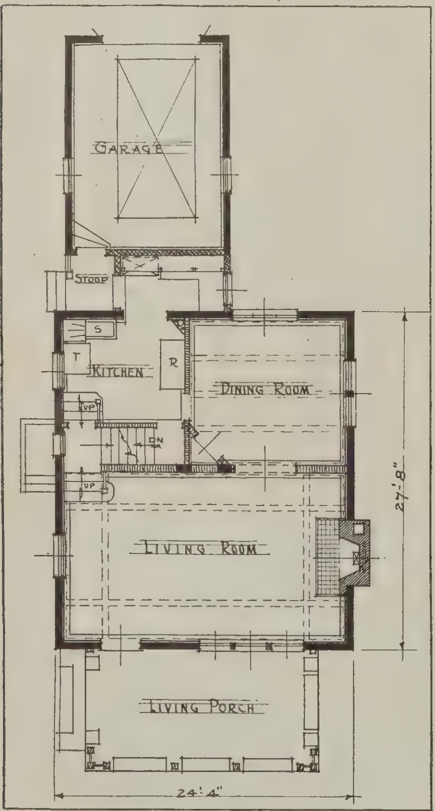
Cellar Excavated and Footing in Place for No. 5

Completed House of Arthur E. Butler

House Ready for Slate Roof and Exterior Finish

Small Concrete Houses—Attractive, Quickly Built and Low in Cost

Flexible Steel and Wood Forms That Make Possible Large Variety of Designs—System Adaptable to Any Type House



First Floor Plan
House No. 2
Arthur E. Butler

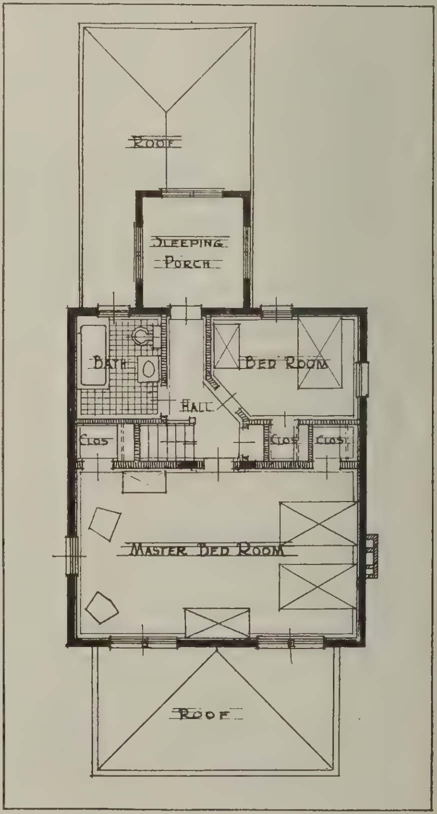
THE concrete house almost disappeared during the war, but it has returned more adaptable, more attractive and more desirable than before. Many builders throughout the country are undertaking the construction of the houses, using generally, a system developed by their own experience, and are meeting with considerable success.

With this article are shown several types of houses designed by Hueber Brothers, Syracuse, N. Y., and constructed on the Hueber System.

The forms are made of wood. They consist primarily of panels, joists and a sill and plate aligner, with column and beam forms for each story. One size of pre-cast spreader, malleable iron tie and wedge are used throughout. Nailing and wiring are eliminated.

When erecting the sill course is first set true and level on the footing. The interior studs are then fastened to this course and the upper ends of the studs are keyed to the steel channel aligner.

Next, the column and beam forms are erected and the center tied together. Pressed steel beams are then set in place to support the floor panels and the interior panels are buttoned



Second Floor Plan
Arthur E. Butler
See Photo Above

in place. All window and exterior door frames are next set up before the exterior studs and panels are placed. The wall is then poured.

After pouring the wall, steel reinforcing rods are placed as well as all sleeves for electrical and heat openings. When this is done the floor is ready to pour. These operations are repeated for each floor.

Job Takes Six Men Eight Days

A crew of six men is used, consisting of five laborers and a carpenter, who acts as foreman. With this gang the average schedule for a 25x 31 foot house is as follows:

a) Erecting forms, 6 men; four 8-hr. days.

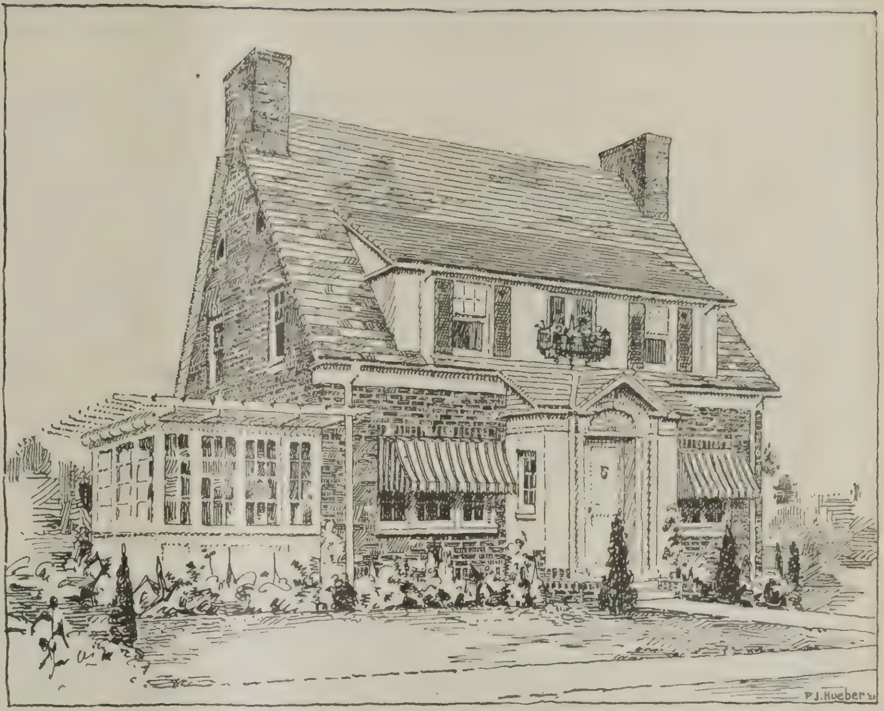
b) Pouring, placing reinforcing and sleeves and erecting a scaffold, 6 men; two 8-hr. days.

c) Stripping and cleaning forms, 6 men; two 8-hr. days.

One man can carry any single part of the forms and not more than two men are needed to erect it. Some of the houses built on this system are shown in a constructed and semi-constructed state. They are characterized by simplicity, rigidity, and are another step nearer to standardization of methods, equipment, and materials. At the same time the desirable variety of design is attained, since the system aims to give the architect the freest possible expression to individual ideas.

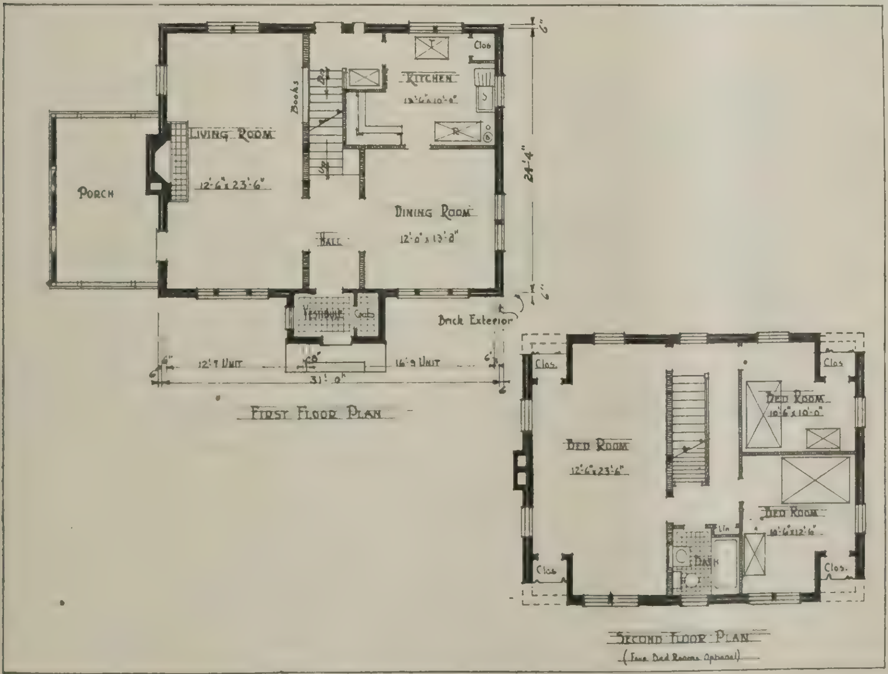
The photograph at the head of the article shows one of the Hueber operations which is now under way in Syracuse. A Number 4 House is under construction at the extreme left of the picture which shows the arrangement of panels and studs. The supporting the top floor panels. metal lumber can be seen in place for

The manner of placing window frames is well shown by the frame in place in the upper story. Precast separators or distance pieces are seen on the ground at the right hand corner of the house.



House No. 5 Now Under Construction
See Photo at Head of Page 22

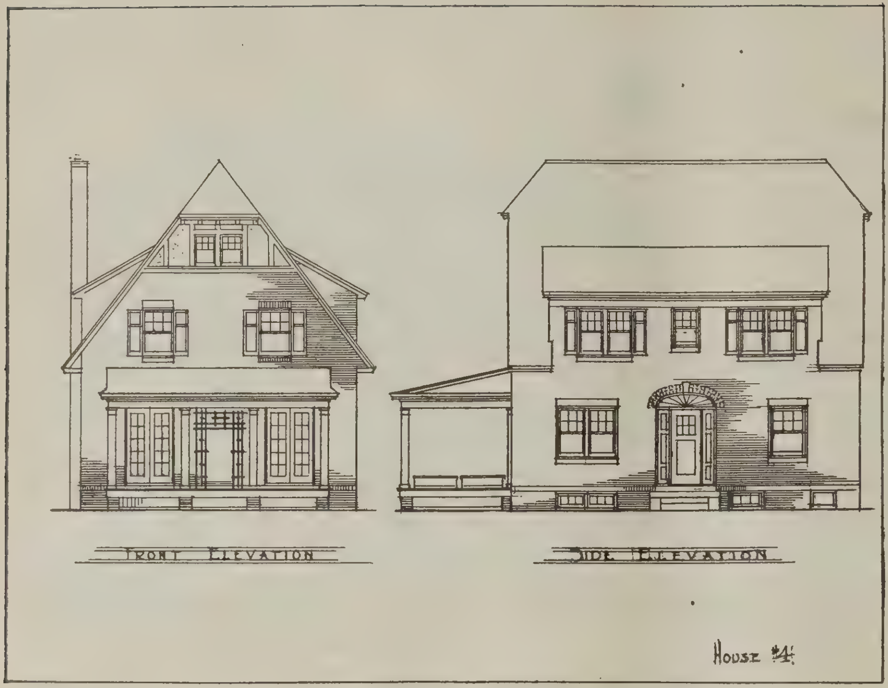
Tapestry Brick Stair Detail in Living Room
Butler House—John S. O'Connell, Decorator



Floor Plans of House No. 5 Shown Above

The Insley equipment used to place the concrete is also seen at the same corner and pours four houses at one setting. The lower courses have been poured and the forms are being made ready to pour the upper courses.

At the right of this house ground has been broken, cellar excavated and footings in place for a Number 5



House No. 4 Also Under Construction
See Photo at Top Page 22

Looking From Dining Room into Living Room
House A. Weiler—John S. O'Connell, Decorator

house. Forms are steel piled in front of the excavated ground.

The completed house in the picture is that of Mr. Arthur E. Butler and is being used not only as a home but as a display house featuring the Butler Manufacturing Company's Products, and also showing decorative ideas of the Eddaro Furniture Company.

At the far end of the picture is a house that has been poured and is now ready for the slate roof and exterior finish.

One of the interesting features in the construction of Mr. Butler's house is the garage attached to the house with an entrance from the back porch. Although used on four houses to date, the forms have shown not the slightest evidence of wear. The simplicity of the system is evidenced by the speed with which the workmen can handle the job.

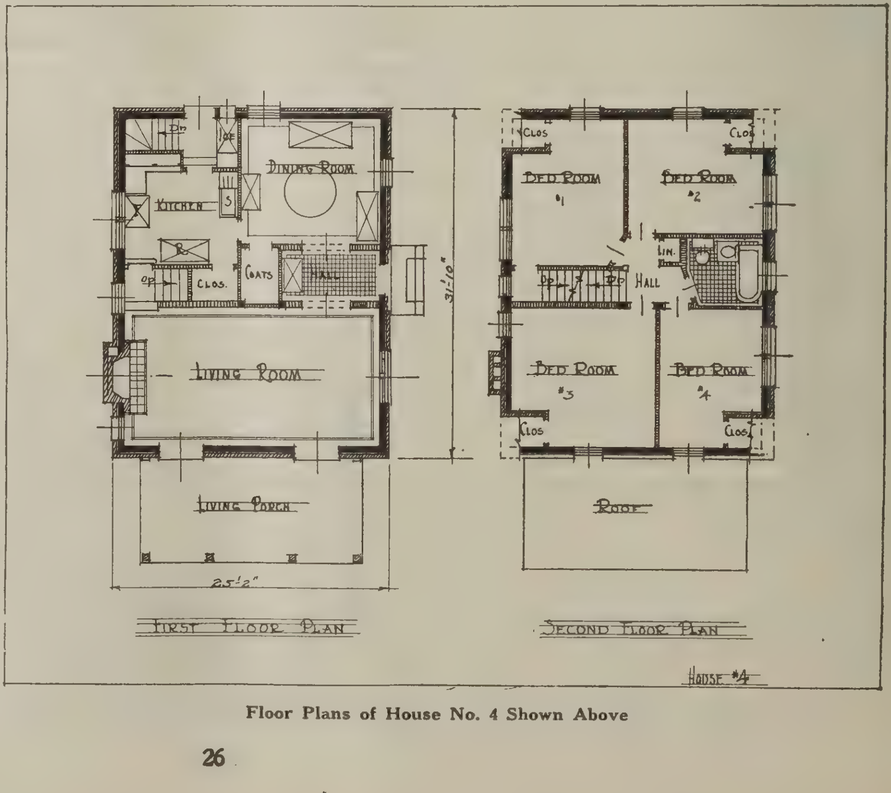
Cost Depends Largely on Interior Handling

Two interesting interiors show the gypsum tile partitions, exposed floor beams and, in one case, a rather unusual tapestry brick stair which has been very well done. Mr. John S. O'Connell, who is associated wtih the Eddaro Furniture Company, handled the interior decoration on all this work and his study of the requirements enabled him to produce a homey feeling and appearance at minimum cost.

Such systems of constructing concrete houses may be applied to homes of almost any price range. The features which largely govern the cost are the value of the lots, types of roof, plumbing, heating and electrical layouts, not forgetting also the interior and exterior finish.

Mark Your Tools

COVER the iron or steel surface, on which the name is to be written, with tallow, then write the name with a scratch awl, cutting clean to the surface, then fill in the lines of the letters with nitric acid; let stand ten minutes, then clean. The name will be written on the iron steel—etched in.



Floor Plans of House No. 4 Shown Above

Good Hardware Makes a House Run Smoothly

EFFICIENT hardware is essential to the smooth working of the house. Every time a door is opened or closed, or a window moved, the hardware comes into use. Inasmuch as it usually lasts as long as the house in which it is installed, it should be selected to serve its varied purposes in the best possible way.

For exterior doors, security is the first essential. Rear and basement doors should be as well guarded as the front entrance. As a protection against dampness all exterior locks should be of brass or bronze.

In certain types of locks it is possible to have the key to the front door open all the other exterior doors, while the key to the rear or side entrance will open only the lock with which it is furnished. This enables the householder to enter at any door, and restricts the servants to their own quarters.

Inside Locks for Convenience

Inside locks are in constant use. Generally a type with a thumb piece on the inside is used. It cannot be lost, works more easily and less noisily than the detachable key. The door may be unlocked from the outside by a key conveniently hung on a hook for emergency use. When a key is used on the inside it is usually necessary to burst the door open in case the occupant is stricken with sudden illness. Bathroom locks should have working parts of brass or bronze that are not affected by steam or moisture.

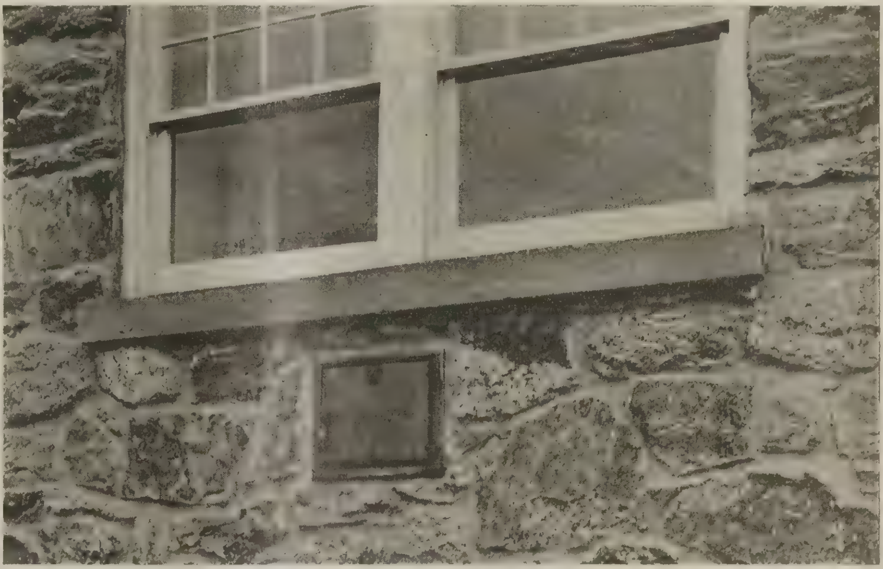
Butts and hinges on exterior doors should also be of brass or bronze since steel or iron will rust and squeak. For heavy doors the butts should be strong enough to prevent sagging. Butts with ball bearings are recommended for this purpose. Indurated fibre washers between the knuckles serve the same purpose successfully, of reducing wear and noise. In some types, retainers prevent the pins from working upward. On doors swinging outward, it is desirable to use fast-joint butts. If loose-pin butts are used, it is a simple matter for an intruder to remove the pins and lift the door from its hinges.

Door checks are a useful addition to the hardware of the house. They eliminate banging and prevent double swinging doors, such as those between dining room and pantry, from passing the center. Such a door swinging freely without a check is frequently a source of accident and injury.

Other places where door checks serve a good purpose are the screen doors, to prevent banging; the butler's pantry door to expedite quiet service; mirror door closets, to prevent slamming and possible breakage; front and rear doors to eliminate drafts. Door checks may be had in two types, one attached to the top of the door and the other sunk in the floor. Both may be bought with the adjustable feature which permits the door to be held in a desired position until released by hand or foot according to the location of the check.

Drawer trimmings on built in closets and cabinets are worth consideration. If pulls are used they should allow enough space for the hand, particularly if the drawers are large and heavy when filled. Handles should match the other hardware in the room.

Sash pulleys should be carefully selected, and a kind chosen that are strong, and whose wheels revolve freely without undue wear to the bearings. A large part of the inconvenience from windows sticking, cords breaking, and sash refusing to stay closed is caused by poor pulleys. If the owner cannot afford pulleys with roller or ball bearing, and bronze or brass wheels, he should at least have those with axles of good size running in generously proportioned bushings. Adjustable window stops prevent rattling and exclude drafts and are therefore desirable. The success of casement windows is largely determined by the hardware attachments, of which many good types are available.



A Package Receiver Adds to the Comfort of a House. No Need for the Housewife to Open the Door for the Delivery Boy

Decorative Hardware

Hardware may be an important factor in the artistic harmony of a room or house. The architectural and decorative scheme of the house should most certainly be considered when the style of hardware is selected, for they come in different styles to match the requirements of the house and it is only sensible to take advantage of this fact. In making the selections it is best to regard the finish of the lighting fixtures and the woodwork of the room in order to achieve harmony in all the fittings.

Concrete Work

JOHN WILEY AND SONS have published Volume I of "Concrete Work," a book that will help the contractor in larger concrete structures.

Tiny Summer Cottages for Seashore and Mountain Resorts

Hints on How to Build Them at Small Expense—Economical Methods of Increasing Hotel Sleeping Accommodations

By FRANK BURTON

THERE are plenty of people who like to spend the summer in some inexpensive place away from town. For such, one of the little homes illustrated in this article will be ideal.

The very cheapest type of cottage is shown in Fig. 4. Here the cedar posts are used to carry a 4″ x 4″ sill, which bears 2″ x 6″ floor joists. Siding is of a composition material surfaced like the ordinary asphalt shingles, the joints being covered with 2″ battens. Wall construction is of the usual 2″ x 4″ studs, set on 24″ centers, and carry a 2″ x 4″ plate. Roofs are of a cheap grade of roll roofing, laid over rough boards carried on 2″ x 4″ rafters, set on 24″ centers.

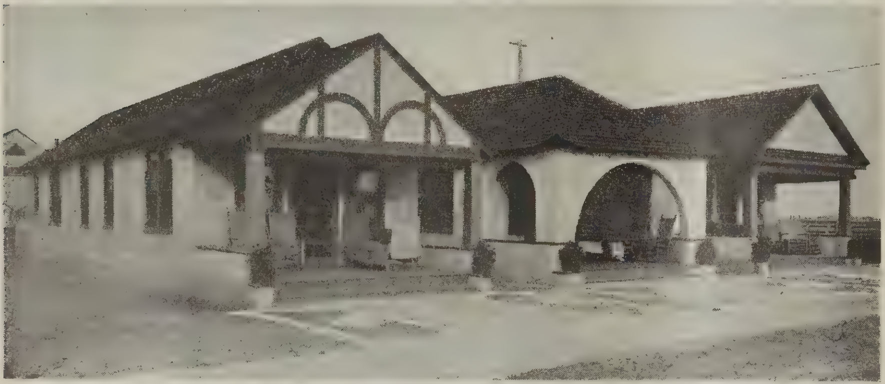


Fig. 1—Narrow Bungalows like this, built in a group, are an ideal speculative venture. They may be suited to summer or year-around use.

The plan of these beach cottages generally consists of one large room divided by curtains. Usually this is all that is necessary as these cottages are generally occupied by a small family, or by a group of young fellows or girls. Studs may be stained and left exposed, or the walls may be covered with any cheap material.

Running water and the usual sanitary arrangements are nearby. Such centralizing of equipment keeps construction costs — and rentals — at a minimum.

This type of cottage is also well suited to house the overflow from a summer hotel. The guests may eat at the hotel and use its sanitary facilities. Such an arrangement is becoming very popular, as the camp idea is spreading. Little cottages like these are better than tents, yet are very cheap to build.

A better type of beach cottage is shown in Fig. 1, and is sufficiently substantial to be used the year round. As each cottage is only 14′ wide, each can be built on a 20′ lot. The same plan is used for all these houses, but the exteriors are different. The three combine to make a much more attractive effect than would one alone. Grouping houses like this enables the narrow houses to combine in an appearance of width if they are treated right architecturally.

A substantially built bungalow is shown in Fig. 3. This type is easy to build and presents a good appearance. No sheathing is used. The studs can be left exposed on the inside and stained. Wallboard is placed up against the clapboards to form a lining. Between clapboards and wallboard, waterproof building paper may be placed, making a dry house. With light construction like this, the corner posts should be well braced.

The sill is carried either on 12″ x 12″ concrete foundation columns, or cedar posts can be used. A few boards and lattice can cover the space between sill and ground.

The log cabin shown in Fig. 2 is ideal for mountainous regions where there are plenty of trees. Indeed, the logs are already at hand, only wanting to be placed and notched.

There are two ways to build a log cabin. One is to place the logs up-

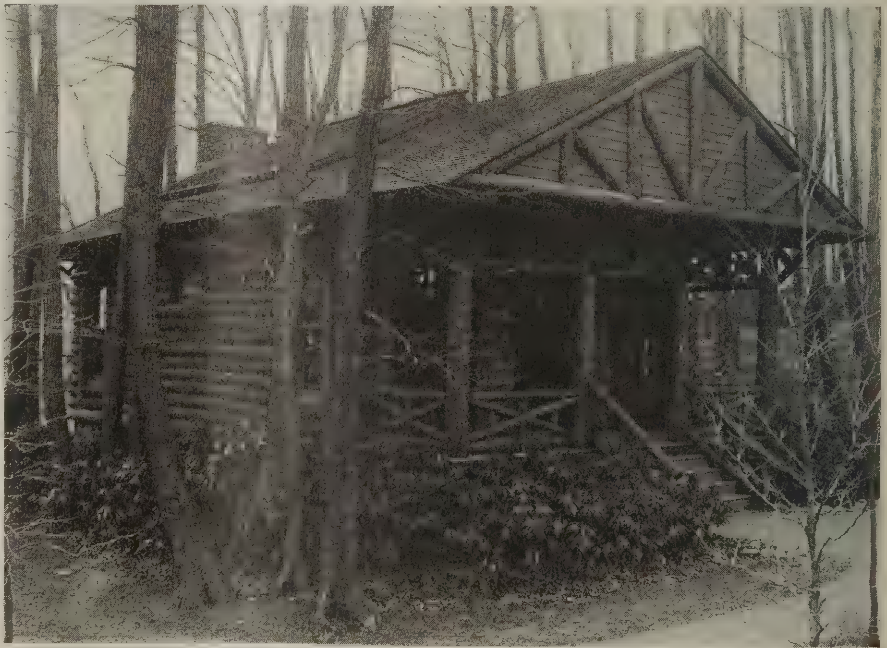


Fig. 2—The Log Cobin type is always suitable for a forest home, where it nestles naturally among the trees. This one is a studio and the roof carries a skylight.

right, stockade fashion, on a sill supported on an appropriate foundation, built according to the funds available, and with a plate. The logs can be halved and waterproof building paper run up on the inside. Back slabs are run up on the inside. This makes fairly tight construction. Or, clay may be forced into the chinks between the logs.

The other method, and the one more used, is shown in Fig. 4, where the logs are laid horizontally. This cabin is of a more substantial type than usual, having a continuous field stone foundation wall, and is suitable for all year round use. At the corners the logs are notched to fit one over the other.

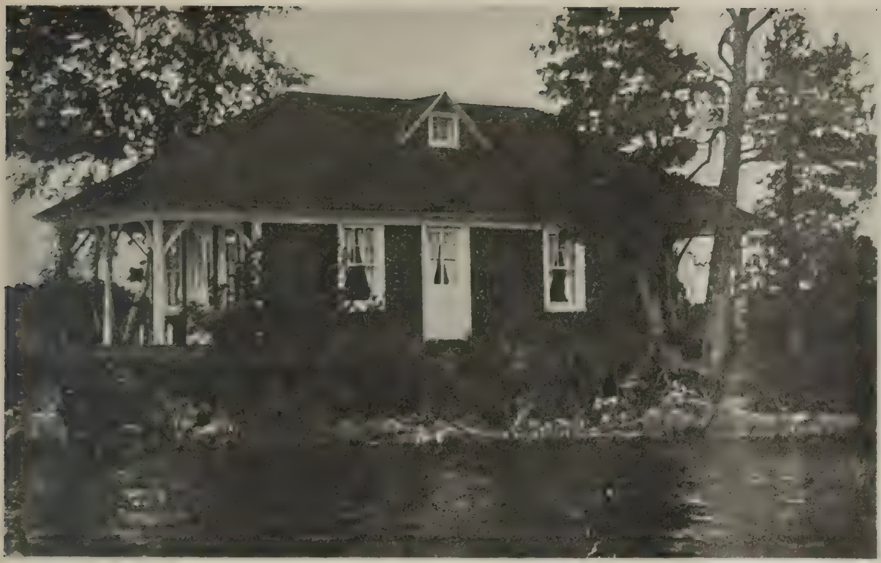


Fig. 3—An inexpensive type of Summer Cottage that is appropriate in any locality.

For preventing the bark from flaking off logs used in rustic structures the Forest Products Laboratory recommends the following methods of seasoning and preparing the timbers as the most effectual:

(1) Cut timbers late in summer and score on two sides; that is, cut off narrow strips of bark for the entire length. Pile in shade in open pile to allow thorough circulation of air. Allow timbers to season until following spring or summer before using.

(2) Proceed as in (1), and, in addition, coat ends, stripped portions, and knots with coal-tar creosote, using one coat a few days after timber is cut and another just before using the timbers.

(3) Proceed as in (1), but do not score bark. When timbers are in place tack bark on with large-headed nails, placing one to every square foot of surface.

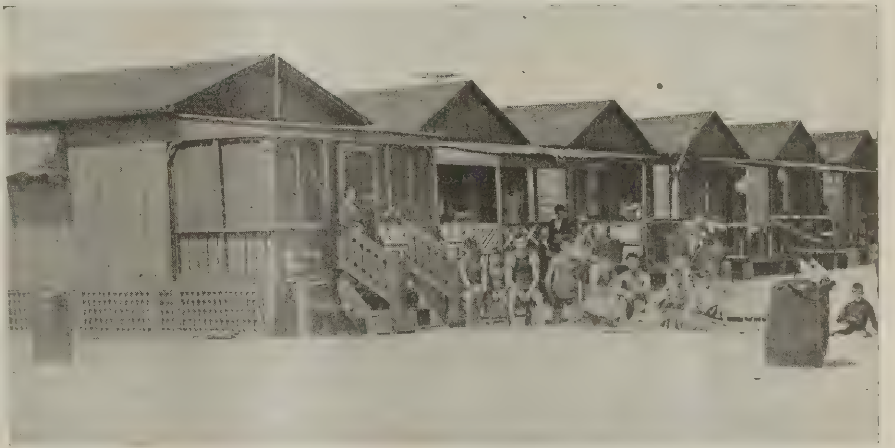


Fig. 4—This type of cottage, erected in large numbers on Staten Island, N. Y., is cheap to build. It sells or rents for a price within reach of all and is ideal for summer colonies or hotel annexes.

Necessity for National Building Code

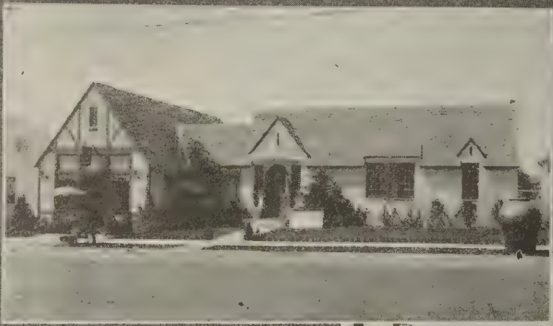
Talk by William P. Tienken Before Annual Meeting Master Builders Association, Suffolk County, N. Y.

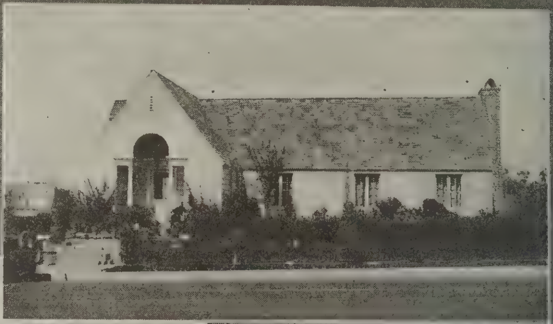
SPEAKING at the annual meeting of the Master Builders' Association of Suffolk County, New York, William P. Tienken, of *Record and Guide*, said:

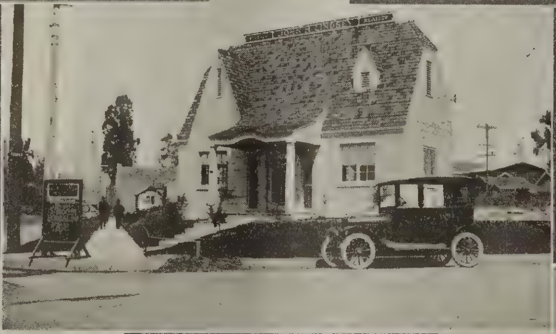
"One of the many things that is now affecting the building industry is the lack of standardization. This lack involves many phases of the industry. Probably the most important at this time is the wide differences that prevail in local building codes. The Federal Government has come to a realization of the chaotic conditions constantly being brought about because of the wide differences in code provisions in neighboring communities and steps have been taken to correct this evil. Secretary Hoover has appointed a committee of prominent engineers, of which Rudolph P. Miller, Superintendent of Buildings of New York City, is one, that is planning for an exhaustive survey of the problem of diversity in building codes and plans to formulate what in all probability will become a Federal Building Code.

"Necessity for a National code is realized by the fact that in certain localities a twelve-inch wall is insisted upon for ordinary dwelling house construction, while in neighboring towns the eight-inch wall is permitted as being perfectly safe. The New York code permits walls eight inches thick, but demands structural timbers be 2x8 inches, while suburban requirements only specify 2x6 inch timber.

"A similar lack of standardization exists in the manufacture of materials. Finished hardware, plumbing fixtures, interior trim, etc., are among the principal items by which, because of the wide selection permitted and the fact that special designs are ordered, building costs are increased. Property owners could build at much lower cost if they did not insist upon special designs and finishes and were willing to accept stock designs which would answer the purpose fully."

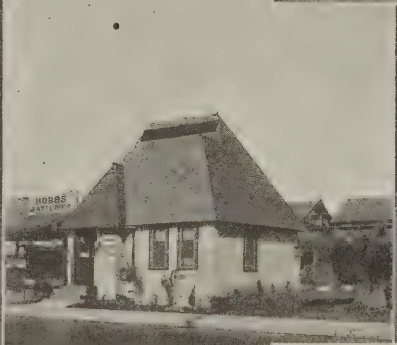




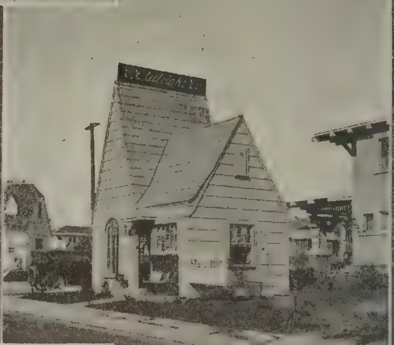


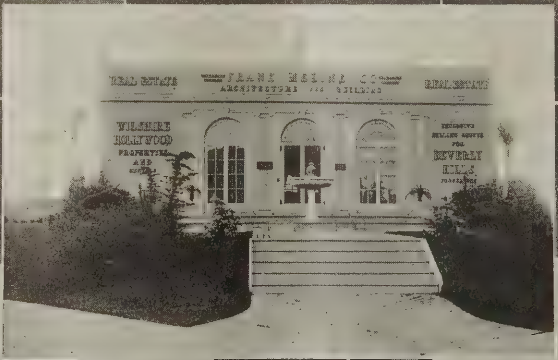
H. F. Whitey, Architect
A. E. Hanson, Landscape Gardener

Above: Pierpont and Walter Davis, Architects, Landscape Gardeners
Center: John H. Lindsey, Real Estate Dealer



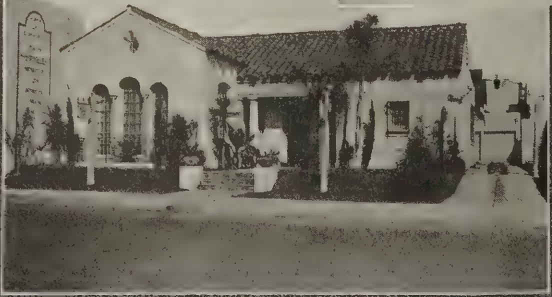
BUNGALOW offices are becoming popular in California. These offices are in outlying business sections.

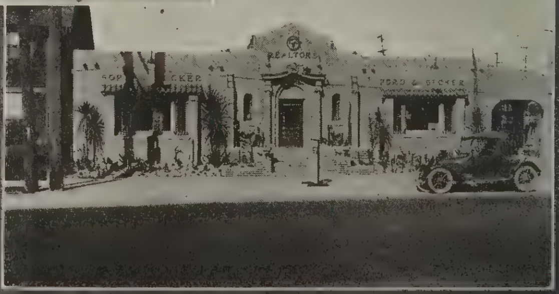




Edwards & Wildey, Builders and Real Estate

C. C. Albright & Co. Real Estate Dealers





H. H. Whiteley, Architect

Center: Frank Meline Co., Builders and Real Estate

Ford & Becker, Real Estate

Business Bungalows in Los Angeles, California

Unique Offices That Help to Advertise Your Business

THE combined offices of Henry F. Whitey, architect, and A. E. Hanson's Landscape Gardener, are linked together only at the roof, but the two separate units are of uniform architectural treatment. The building is a single story in height and is a good representation of the English cottage. The outside walls are of cement-stucco, finished in a weathered shade of yellow, with lead-brown trimming, and the shingled roof, with the shingles laid in a sort of haphazard manner, is in varying shades of brown and green, in hit and miss style. The shingles were, of course, dipped before being laid. The gardener's division differs in outside appearance from the architect's portion only in that the walls simulate a half-timbered effect. A garden of lawn and shrubs surrounds the building, and the structure has the general appearance of being an ordinary residence with a small-shop annex. The windows of the studio are of the casement type, mullioned into tiny panes. The interior, partitioned into several rooms, is finished with soft, dull brown woodwork and hard-surfaced plaster walls painted a dull tan. Mr. Whitey, the architect, was the designer.

The attractive office of H. H. Whiteley, architect, is also but one story high and is of modified Spanish architecture, planned about an entirely enclosed *patio* containing a fountain and pool and an attractive planting of low-growing shrubs and lawn. The outside walls are of cement-stucco over frame construction, and are painted a light sky-blue color, while the trimming is done in a deeper shade of the same blue. The roof is of Spanish roofing tile in dark browns and reds. The front walk and entrance are paved with dark red tile, and, comprising still another variation in the color scheme, the porch pillars and overhead beam are of artificial stone in a light yellow shade, while heavy, rich draperies of mustard color are used inside at the windows. Further, the windows on the front have grilles of black wrought-iron. The view afforded as one enters the front door is especially interesting, for he steps into a small but richly finished, furnished and decorated reception room, beyond which, through French doors and windows, is revealed the attractively arranged *patio*. The interior woodwork, in reception room and main office, is of dark-brown Mexican mahogany, and the hard-surfaced plaster of the walls and vaulted ceilings are painted a rich light brown. Besides architectural designing, Mr. Whiteley conducts a business in building, decorating and furnishing, and his studio naturally presents excellent specimens of his craftsmanship in these various lines. A lawn and garden is featured in front of the building, and in the rear are garages that correspond in architecture with the studio.

THE offices of Pierpont and Walter Davis, Architects and Landscape Gardeners, is a simple but pleasing modification of the English-cottage style of architecture. The outside walls are of clapboard siding, painted white, and the trimming is done in creamy yellow, while the shingles of the roof are laid in irregular style and, having been dipped before laying, are a mixture of yellows, browns, reds and greens. The recessed little entrance porch has an exceptionally attractive treatment in the way of hand-frescoed frieze and vault-ceiling, and directly in front of the entrance, with brick-paved walks about it, is a small pool stocked with gold-fish and planted with lily-pads. The building is situated just on the edge of a bluff that faces away from the street, and in consequence is made two stories high as seen from the rear. The reception room, main offices and display studio are located on the top or street-level floor, and on the lower floor, excellently lighted from the back, are the draughting rooms. The main-floor studio is provided with a massive brick fireplace, and the grounds in front of the building are in attractive garden style.

SHOWN in the next illustration is the main business office, located on corner of South Western Avenue and Sixth Street, of Ford & Becker, real estate agents and home builders. The building, a single story one, in a striking modification of the Spanish style of architecture, is the business office of Ford & Becker, real estate agents. The outside walls are of light brick-red cement-stucco, trimmed and lettered in dark blue. It is designed with a flat composition roof, and is attractively finished on the front with red tile cornices over the windows. The entrance is framed with cast artificial stone of ornate design, which is of sandstone color, and the approach thereto is of red brick construction. On the front is a bit of exceptionally interesting garden, which is devoted principally to a rare, botanical collection of cacti, each of the many species being labeled with the name. In the rear, with French doors giving access to it from the reception office, there is a roomy court, or patio, enclosed on three sides by the building's walls, which is treated in garden style, while along the right-hand side is an automobile driveway protected by a *porte-cochere* extension. The inside walls are of stucco also, with a rough-troweled finish, and are painted to present a reddish-buff color with a semi-indistinct mottling of old-blue. At night in front of the building is illuminated by red-globed electric lights, so turned as to throw their rays against the walls, thus making the front to stand out prominently and conspicuously in a bright red radiance. The building was designed by H. H. Whiteley.

The building of the Frank Meline Company is a representation of modified French architecture, set diagonally across the corner of a corner lot, with the ground in front terraced and landscaped. The walls are of vertical-set pine, tongued and grooved, and painted a light shade of yellow, over which is a network of latticing that is painted olive-green. The front doorway and the French windows at either side, as well as similar windows in each side or end, are finished with arched tops, artistically scrolled, and the trimming about them and elsewhere is in a dark shade of lead-gray. Before the entrance is set a large artificial-stone fountain, and the approaching steps and walk are of board construction. The lettering on the front and sides of the building is done in black and gold. Four electric-light reflectors illuminate the building at night.

(Continued on page 47)

Finding Cost of Concrete Work

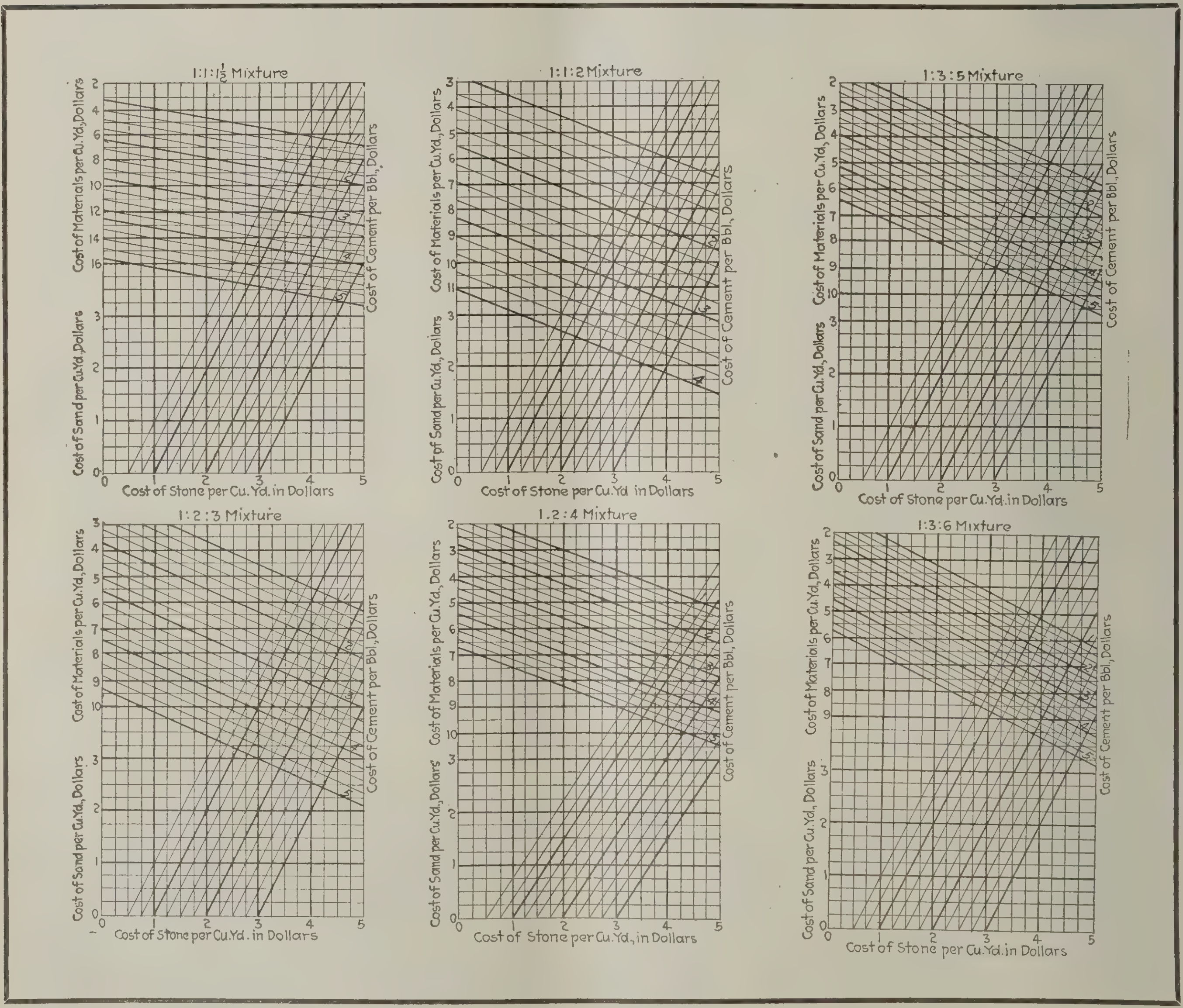
Charts That Show Cost Materials and Form Work for Varying Cost Cement, Sand, Stone, Lumber and Labor

By G. C. HABICHT

QUICK estimates on the job are often necessary either on new or old work. It is not always convenient to take out the old notebook and pencil and stumble through a lot of mathematics just to find what a 1:3:5 concrete will cost per cubic yard, or how much the forms will cost. And sometimes the builder wants to know these things a little more accurately than by guesswork.

The following charts are valuable for quickly finding this information. They may be used for different mixtures and on different types of forms.

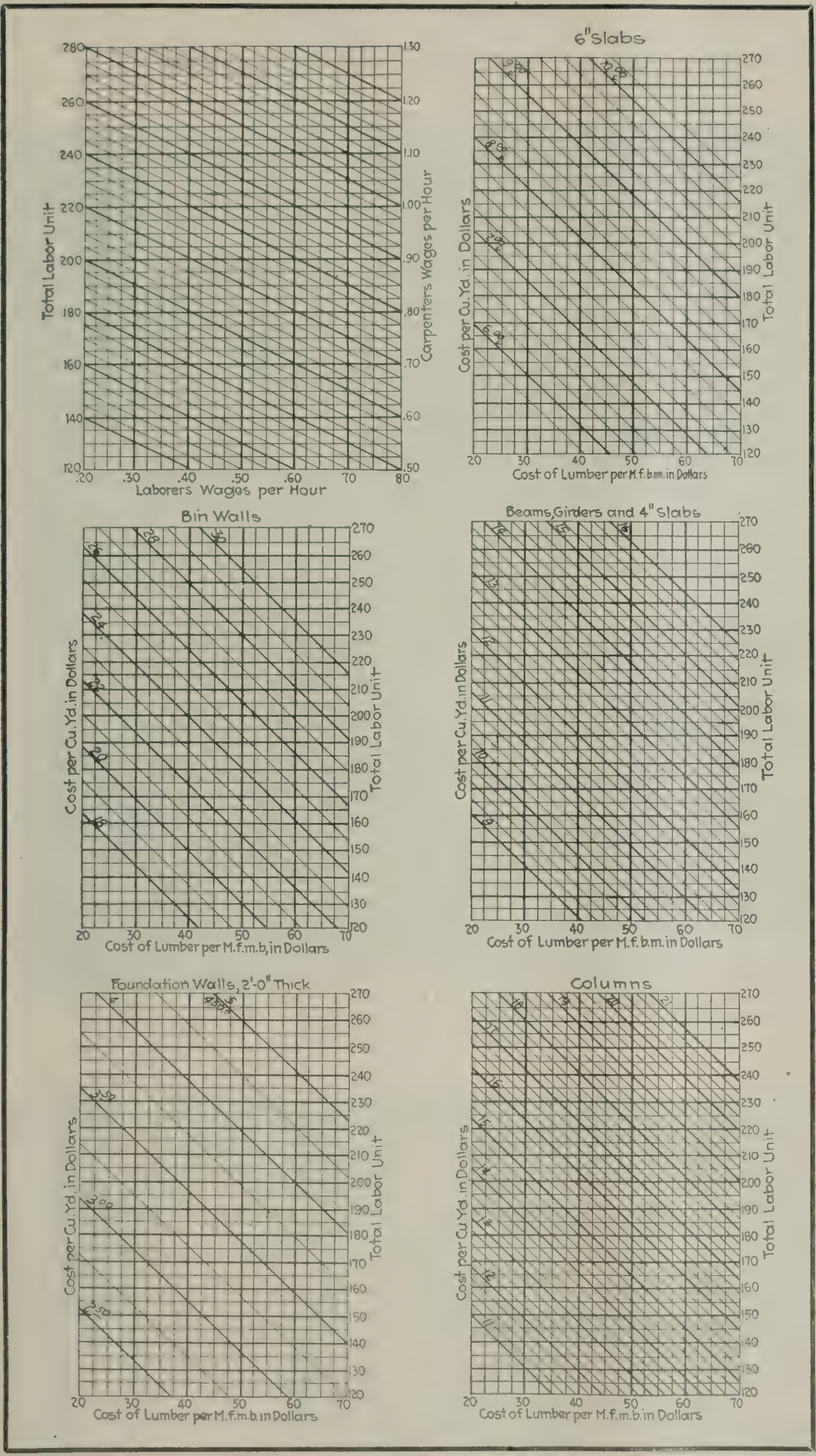
COST OF MATERIALS



Assuming a 1:2:4 mixture and prices of $2.00 per cu. yd. for stone, $1.50 per cu. yd. for sand, and $3.00 per bbl. for cement, enter chart at bottom on diagonal line indicating cost of stone ($2.00). Follow diagonal to intersection with horizontal line indicating cost of sand ($1.50). Then follow vertical line through this intersection until it intersects diagonal indicative cost of cement ($3.00). From that intersection follow horizontal line to left to the total cost of all materials, $6.62 per cu. yd.

1 bbl. cement = 3.8 cu. ft. % voids in stone or gravel = 45%. Cement costs are net; bags are not included.

COST OF FORM WORK



Assuming carpenters' wages 90c. and laborers' wages 50c., enter chart at 90c. and follow horizontally to intersection with vertical line through labor wage of 50c. The diagonal line through this intersection gives the Labor Unit 230. For beams and girders, enter chart at 230 labor unit and follow horizontal line to intersection with vertical line through lumber cost, say $50 per M. ft. b. m. Diagonal through this intersection indicates $14.58 total cost of form work per cu. yd. concrete.

Curves are based on using lumber three times.

How to Clean Brick

ONE of the greatest troubles with the average brick house is that the white substance called efflorescence is quite likely to appear on the brick work and spoil the looks of the house. This is especially true when the softer grades of brick are used, as is the case in the cheaper type of house, or in factory buildings.

Naturally the average man who owns a house likes to have it appear at its best, and there is no reason why he should not gladly welcome the suggestions of a contractor who offers to clean the efflorescence off and prevent its recurrence.

The efflorescence may be taken off either by scrubbing with a stiff brush or by scrubbing with a weak solution of muriatic acid and water, in proportions of about 1 to 20. This work is usually done with a scrubbing brush.

After cleaning the brick thoroughly, in dry weather, a good method of preventing a recurrence of the trouble is to use what is called Sylvester's process. This consists of alternate washes of soap and alum. The soap (usually castile) and water is applied boiling hot, with a scrubbing brush. After twenty-four hours the alum is applied cold. This process is repeated two or three times and is usually sufficient to take care of any trouble.

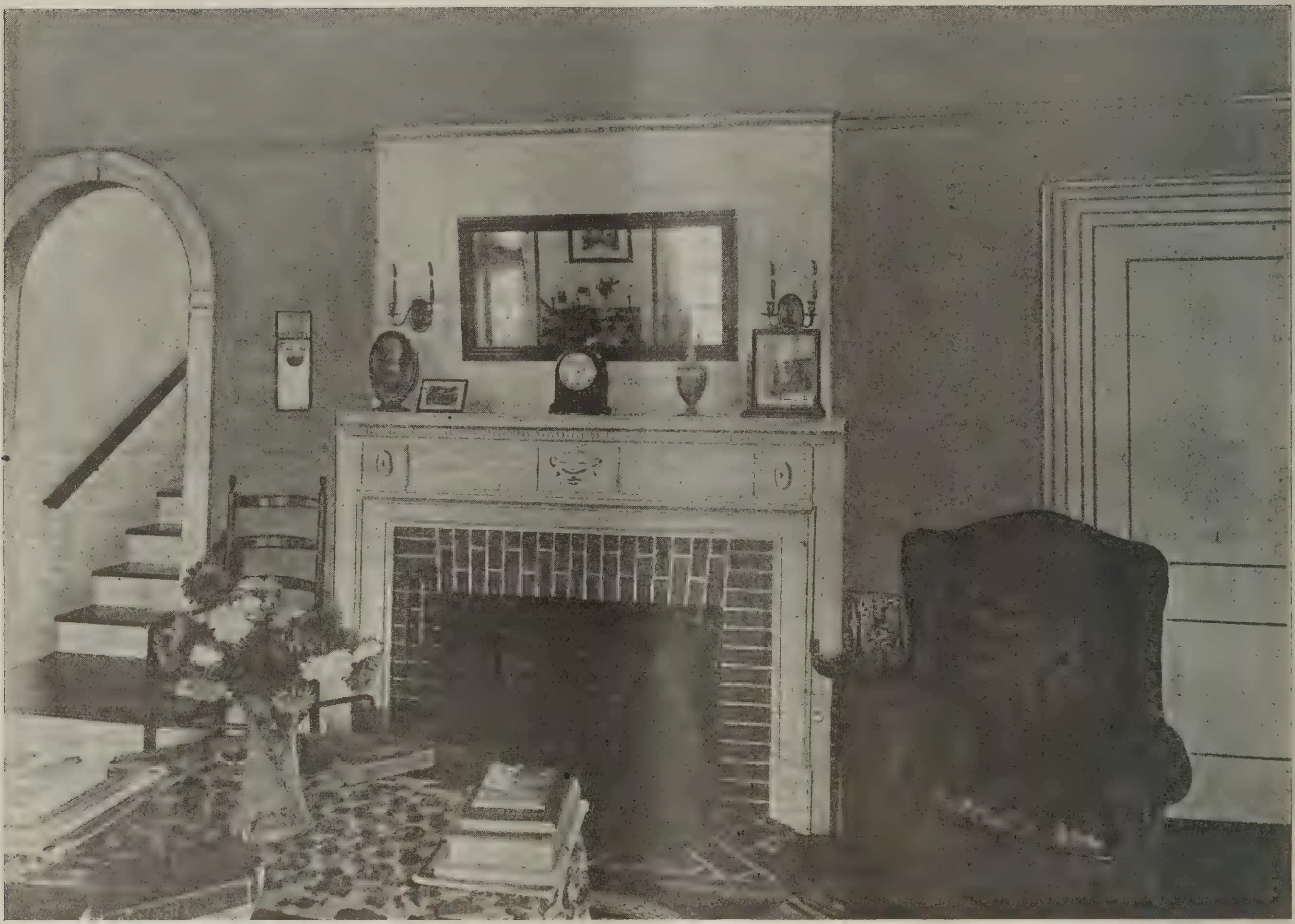
The efflorescence is never caused by the brick or by the mortar alone, but by a combination of the salts in the two. The most usual cause in new walls is that the action of the lime in the mortar upon the silicate of soda in the bricks causes the deposit to be made in damp weather, when the walls become wet. The water dissolves the salts and carries them out upon the face of the brick; when the water evaporates, the salts are left there in the shape of efflorescence.

In building brick walls, the danger of efflorescence can very largely be avoided by using hard brick for the face, and if possible a white Portland cement, or some non-staining cement for the mortar.

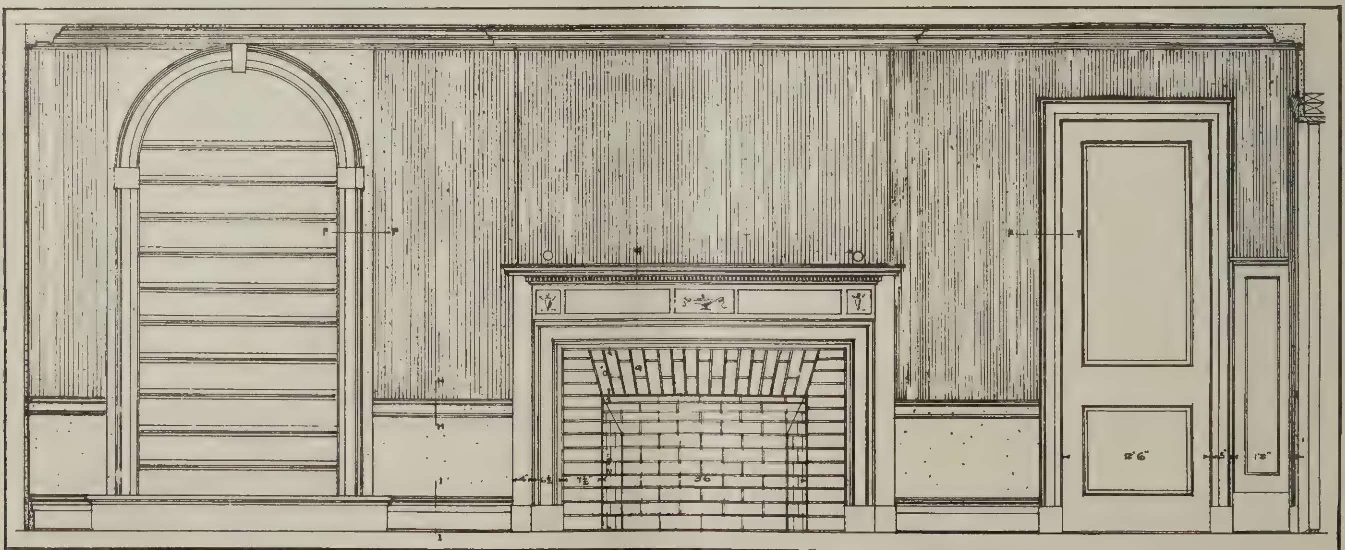
Efflorescence, to a certain extent, tends to disintegrate the inside of a brick, much like the action of frost. To prevent this crystallization of the salts inside the brick, it is necessary, of course, to keep the water from the face of the wall by some such process as Sylvester's, using harder brick for the face of the wall.

Attractive Fire Place Detail

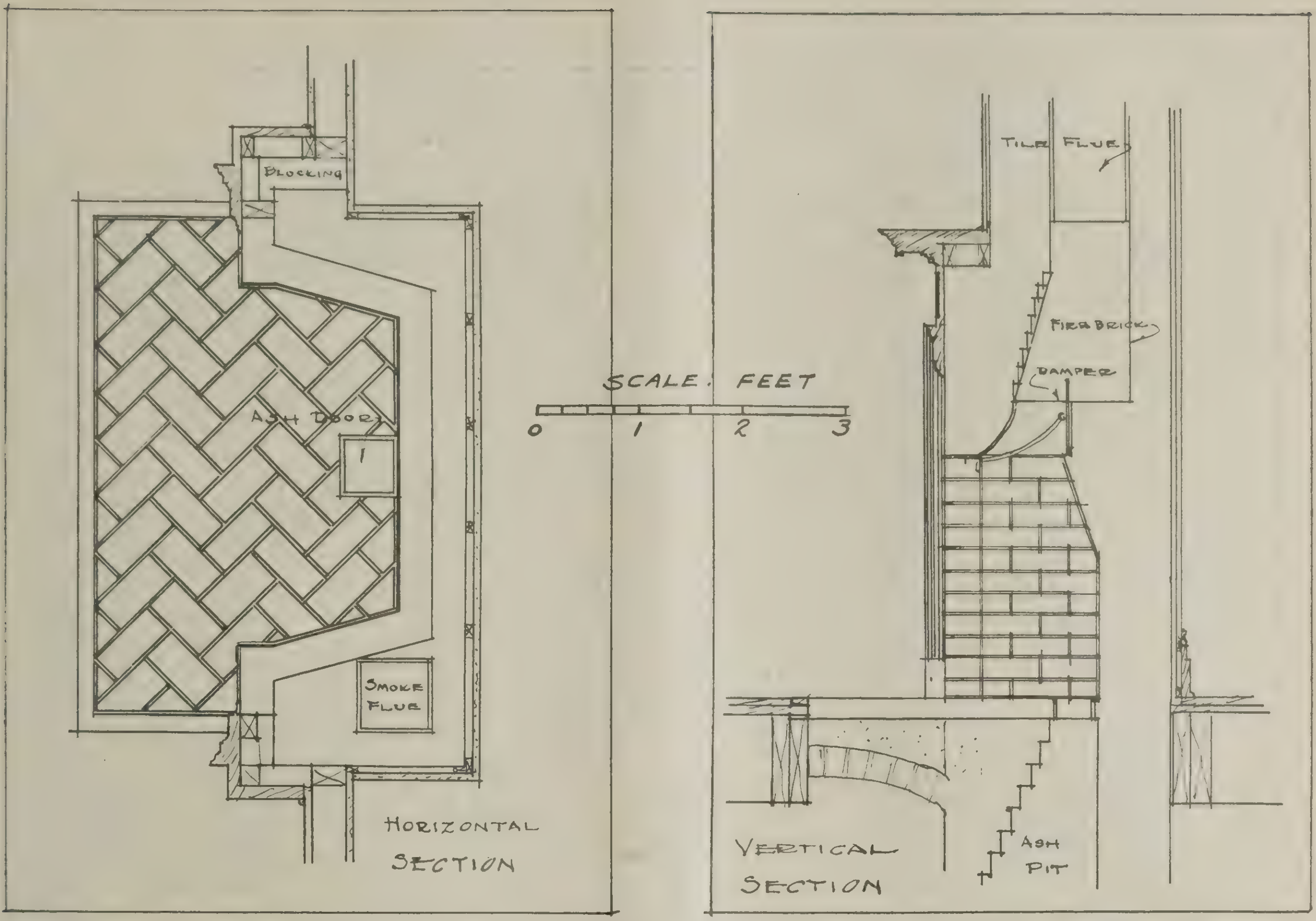
Zoller & Buchtenkirk, Architects



INTERIOR LIVING ROOM—HOUSE OF LUBIN PALMER, SCHOOLEY'S MOUNTAINS, NEWJERSEY.



FIREPLACE DETAIL—HOUSE OF LUBIN PALMER, SCHOOLEY'S MOUNTAINS, NEW JERSEY.



Plan

Section

Fire Place Detail Shown on Previous Page

Six Room House That Can Be Built on Small Lot

Davis McGrath & Kiessling, Architect

WHEN the Bureau of Industrial Housing & Transportation wanted to erect small attractive homes at Watertown, N. Y., homes that would be livable and economical, they sought experts in that line of work and put the job up to them. The problem appears simple but its very simplicity makes it hard. Real beauty, simplicity and economy should always be found going hand in hand, yet many times we find beauty sacrificed to get economy and simplicity, or *vice versa*. The demand today is for small houses on small lots, because the cost of anything else is just now prohibitive.

On the following pages are produced the drawings of one of the houses at Watertown. The plan is square and provides for a two-story house with three rooms on each floor. The exterior is simple and attractive.

Stock material is used throughout to keep down the cost.

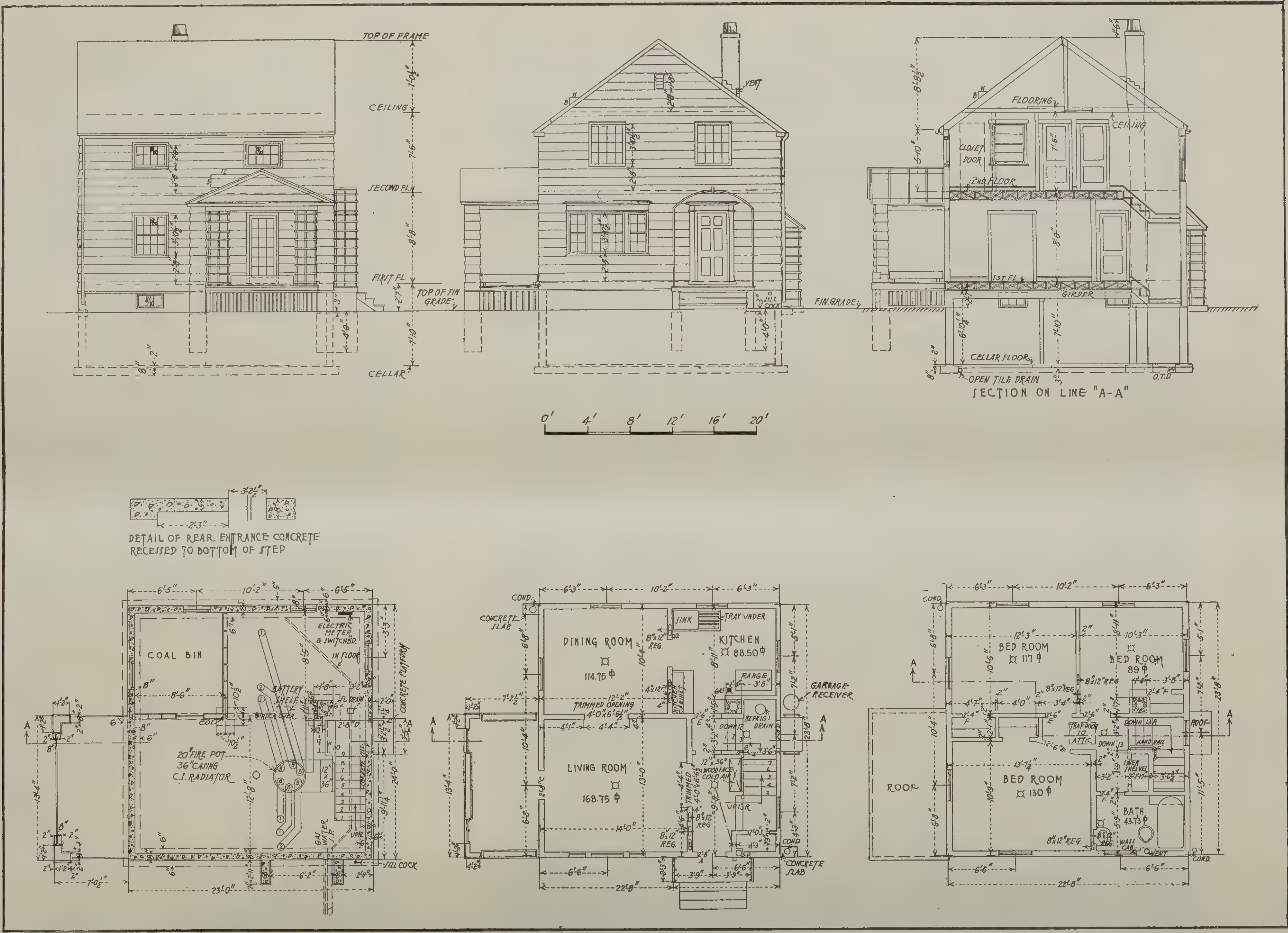
Houses that can be built cheaply and quickly are in demand today. many of such houses do not present an attractive appearance after they are up and are therefore more or less difficult to sell. The example shown on pages 36 and 37 can be put up today in the vicinity of New York City for approximately $5,500.

The basement floor is on concrete and provides for coal bin and warm-air furnace installation. All foundations are concrete.

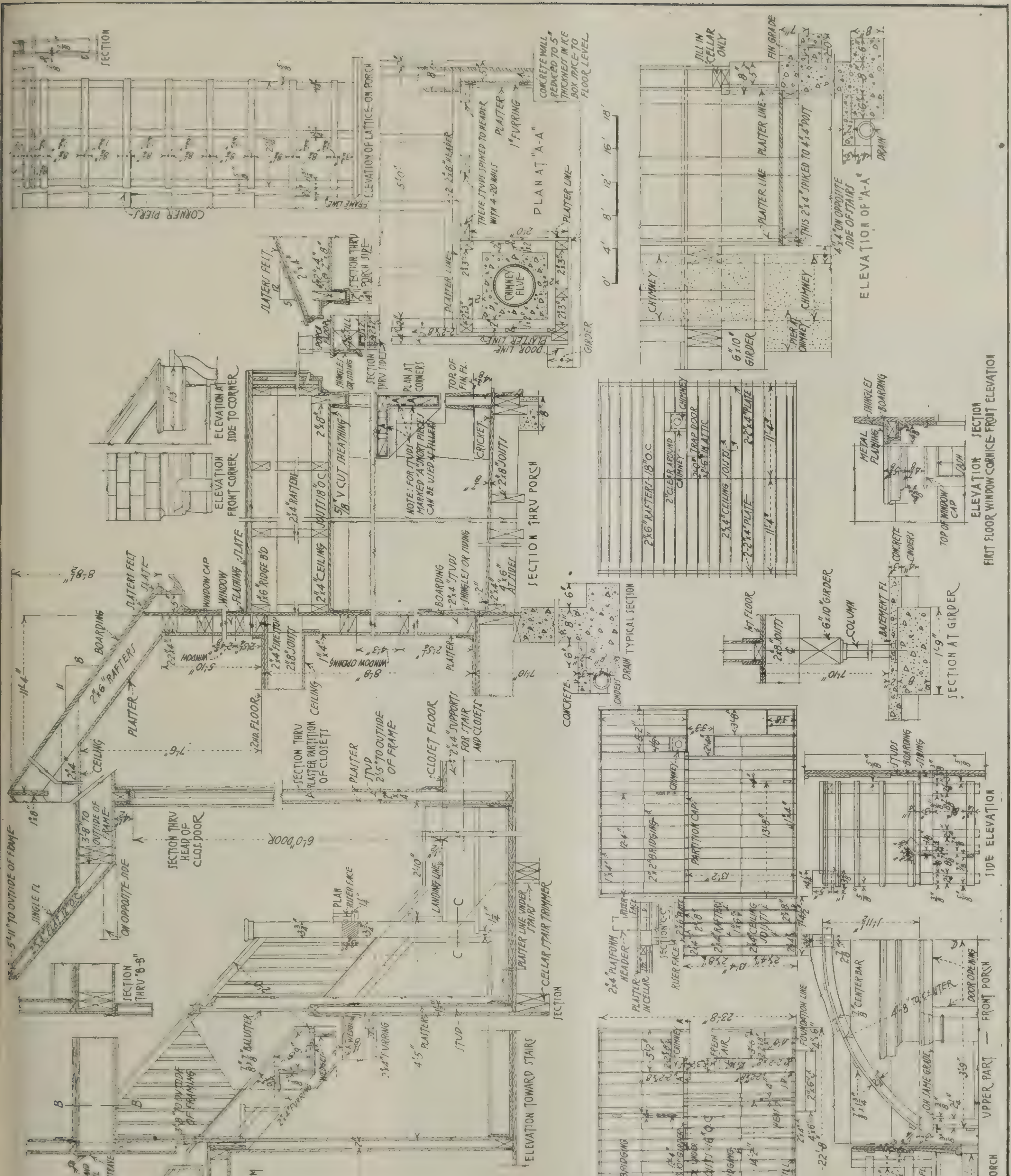
A 13x14 foot living room, 10x12 foot dining room, and 9x11 foot kitchen, insure fairly large and livable rooms on the first floor. Sink and kitchen cabinet are built-in. Refrigerator is outside the kitchen on a landing leading to the cellar. A utility closet is in the large front hall at the foot of the second floor stairs.

The three bedrooms on the second floor are all provided with large closets, with a linen closet in the hall. These rooms are large, 11′x14′; 11′x12′ and 9′x10′, respectively. Windows in adjacent walls give cross ventilation. The bath is 6′x9′.

The construction is all frame and ample details are shown on page 37. The lattice work on the porch and over the side and rear entrances gives a final pleasing touch.



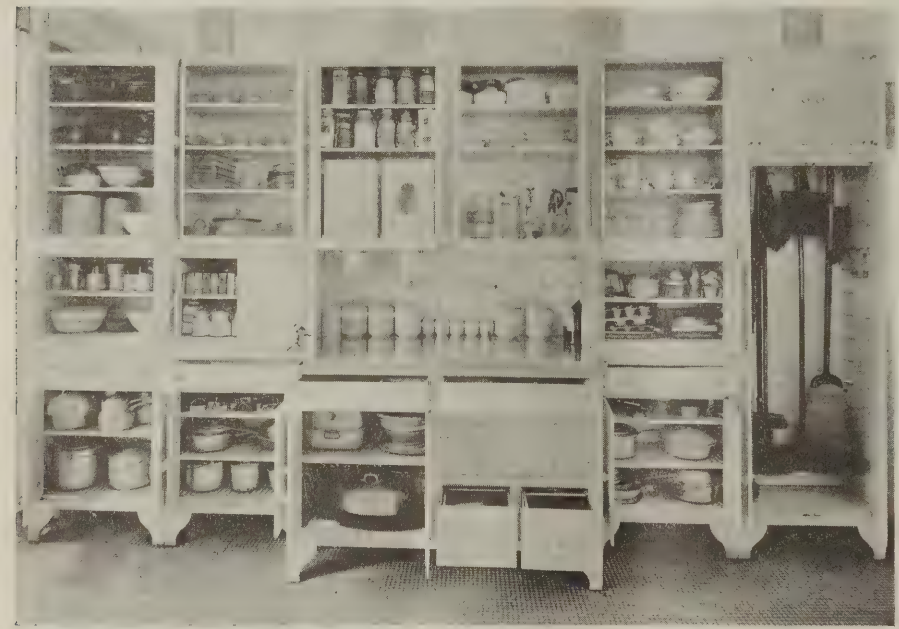
Plans and Elevations—Economical 6-Room House for Small Plot
For Details See Page 37


SECTION THRU PORCH
ELEVATION OF LATTICE ON PORCH
CORNER PIERS
FRAME LINE
PLAN AT "A-A"
CHIMNEY FLUE
THESE STUDS SPIKED TO HEADER WITH 4-20 NAILS
CONCRETE WALL REDUCED TO 5" THICKNESS IN ICE BOX SPACE TO FLOOR LEVEL
PLASTER LINE
DOOR LINE
GIRDER
SILL IN CELLAR ONLY
FIN. GRADE
ELEVATION OF "A-A"
THIS 2"x4" SPIKED TO 4"x4" POST
4"x4" ON OPPOSITE SIDE OF STAIRS
CHIMNEY
6"x10" GIRDER
DRAIN
SLATERS FELT
SECTION THRU PORCH SIDE
SECTION THRU SIDE
PORCH FLOOR
SHINGLES OR SIDING
PLAN AT CORNERS
TOP OF FIN. FL.
ELEVATION AT SIDE TO CORNER
ELEVATION FRONT CORNER
NOTE: FOR STUDS MARKED "A" SHORT PIECES CAN BE USED AS FILLERS
5/8" V CUT SHEATHING
CRICKET
2"x8" JOISTS
2"x6" RIDGE BD
2"x4" CEILING JOISTS 18" O.C.
2"x4" RAFTERS
SECTION THRU PORCH
2"x6" RAFTERS 18" O.C.
2"x2" CLEAR AROUND CHIMNEY
2'-0"x2'-6" TRAP DOOR IN ATTIC
2"x4" CEILING JOISTS
2"x4" PLATE
TYPICAL SECTION
CONCRETE
CINDERS
1ST FLOOR
6"x10" GIRDER
COLUMN
BASEMENT FL.
SECTION AT GIRDER
METAL FLASHING
SHINGLES
BOARDING
TOP OF WINDOW CAP
ELEVATION SECTION
FIRST FLOOR WINDOW CORNICE-FRONT ELEVATION
SLATERS FELT
SLATE
WINDOW CAP
WINDOW FLASHING
BOARDING
2"x6" RAFTERS
PLASTER
CEILING
2ND FLOOR
WINDOW OPENING
2"x4" STUDS
SHINGLES OR SIDING
SECTION THRU PLASTER PARTITION OF CLOSETS
CLOSET FLOOR
2"x4" SUPPORTS FOR STAIR AND CLOSETS
SECTION THRU HEAD OF CLOS. DOOR
6'-0" DOOR
5'-4" TO OUTSIDE OF FRAME
SINGLE FL.
ON OPPOSITE SIDE
SECTION THRU "B-B"
PLAN RISER FACE
LANDING LINE
PLASTER LINE UNDER STAIRS
CELLAR STAIR TRIMMER
SECTION
2"x2" BALUSTER
2"x4" FURRING
PLASTER
STUD
ELEVATION TOWARD STAIRS
SECTION THRU PLATFORM
SIDE (REAR) STAIRS
LANDING
FACE OF PLASTER AND FINISH OF BASE ON OPPOSITE SIDE
SECOND FL. LEVEL
HAND RAIL
ARCHITRAVE
2"x2" BRIDGING
PARTITION CAP
SECTION "C-C"
2"x4" PLATFORM HEADER
RISER FACE
PLASTER IN CELLAR
FRESH AIR
FOUNDATION LINE
6"x10" GIRDER
2"x8" JOISTS 16" O.C.
STUDS
BOARDING
SIDING
SIDE ELEVATION
CENTER BAR
4'-8" TO CENTER
DOOR OPENING
ON SAME GRADE
UPPER PART — FRONT PORCH
LOWER PART - FRONT PORCH
FRONT
SIDE
PITCH TO PORCH FL.

Good Closets Make Small Houses More Livable

Orderly Storage Space Now Replacing Old-time Catch-alls—Improved Closet Design

THE house that would be a home must please the woman. The home that would please the woman must have plenty of closets. Many a poor house has been redeemed by its closets. Many a better house has been passed for the want of them.



A Very Complete Metal Cabinet for Kitchen Use—Note Broom Closet at Right

It seems to be human nature to like system, but it also is true that most people regard as drudgery any systematic effort to keep order in the house.

The fault may usually be traced to the closets. Either inadequate as to size or inaccessible as to location, an excellent opportunity is lost to provide the subtle little comforts that a woman cares about.

It is the easiest thing in the world for a woman to find things to tuck away. Whether it be clothes, linens, china, papers, childhood relics or whatnot, there is always more than she can usually accommodate.

All of this is opportunity for the builder. If he study the different types of closets possible throughout the house, and provides them, he makes the house that much more livable and desirable.

A closet should be no wider than its door. If it is, one has to feel around in the dark, and without seeing what one is doing. A number of small closets easily kept in order give better service than a large one that can be only partly used. Where electricity is available, it is desirable to have a low candle power lamp to automatically light as the closet door opens.

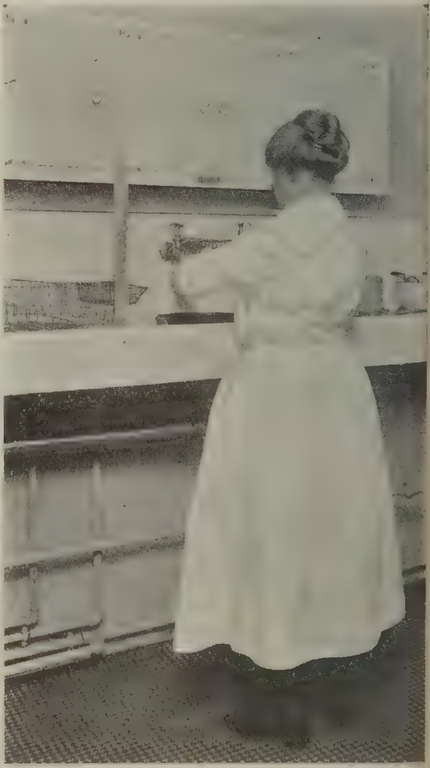
Closets today are specialized. The conglomerate herding of things in one large closet has died out. We now know clothes closets, linen closets, shoe closets, kitchen closets of various types, bathroom closets, cellar, attic and storeroom closets, and others in large variety. Al lof these may be designed with special reference to their purpose, and each accordingly may be efficient.

They should be so placed as not to break up large wall surfaces. Their woodwork should partake of the interior trim of the room, and they may well extend inside, the full height of the wall. This is particularly true for clothes, linen and pantry closets, the upper part of which may be used for storing things that are not in regular or constant demand.

Clothes closets are no longer designed as mere spaces with a door in front, whose equipment was a lot of hooks poked into every available inch. The least one can do is to extend a pole horizontally near the top from one side to the other. This will accommodate compactly more coat hangers and garments than the hooks. The pole, of course, should be smooth and grooveless, so that dust cannot lodge on it.

A highly desirable fixture is made that saves space, creates order and reduces construction costs. It consists of a rod running from the back to the front of the closet, attached to the underside of a closet shelf. From this rod are suspended coat hangers and garments. The rod may be extended, thus bringing the garments out into the room where it it easier to get at them. By the compactness of the arrangement, small closets so equipped provide equal capacity and more convenience than larger ones not so supplied.

It is always a source of convenience to have full length mirrors on the doors of bedroom and bathroom closets.



Small Cabinets Above Sink Are Convenient

Dressing tables as illustrated come in stock designs. This one has a swinging mirror at either side, a large mirror in the back, three drawers and two cabinets, besides the hanging closet and tray case at each side.

Tray cases are useful. A series of shallow drawers maks it possible to utilize practically all of the space. One can readily understand that in deep drawers, usually only the bottom of the drawers is used for the accommodation of belongings, while the upper part is wasted space. Shallow tray cases, as these are called, permit not only of economy of space, but a better classification of belongings, and the improved order incident thereto. An ordinary closet door protects them from dust and exposure, and adds to the harmony of the woodwork in the room.

Shallow tray cases are also for linens. These cases may be built like drawers without the front end, so that towels, etc., can be taken out without pulling out the trays, if desired.

A hat closet set aside for nothing but hats will meet the approval of every woman. It may reach from the floor to the ceiling and be divided into compartments of different sizes. By this arrangement the necessity of a hat box is made unnecessary. The lowest compartment, which would be the floor of the closet, might well be a shelf for shoes. A narrow strip of wood running across this shelf from one side of the closet to the other will prevent the shoes from being pushed to the back of the closet and will keep them in an orderly row

Particular opportunity is afforded the builder in the matter of kitchen closets. Every housekeeper today wants a well organized kitchen cabinet. Many fine types of these are available in stock designs, with all the conveniences that economy of effort can dictate. Many of their advantageous features can be incorporated in homes of the more modern type where owners do not care to invest in these standard pieces.

For china, cups and bowls, the shelves should be shallow, as nesting these things is awkward and unsafe. As an ideal toward which to strive, the spacious white closet here presented is recommended for the larger house. It will be noted that this consists of a series of units, any number of which may be combined to serve the individual needs. The cleanliness and accessibility of contents are very inviting.

A broom closet properly does not belong in the kitchen, although to concentrate things in restricted wall space it is permissible to place it there. Broom closets should be large enough to accommodate the vacuum cleaner also. A small closet over the sink is useful for soaps, polishes, clean dish towels, etc.

Much saving of space can be effected by the use of the steel kitchen units illustrated. A study of the plans will indicate how nearly $800 may be saved on the cost of a five-room bungalow by the use of such a unit which comprises a small refrigerator, grocery closet, sink, dish closet and range.

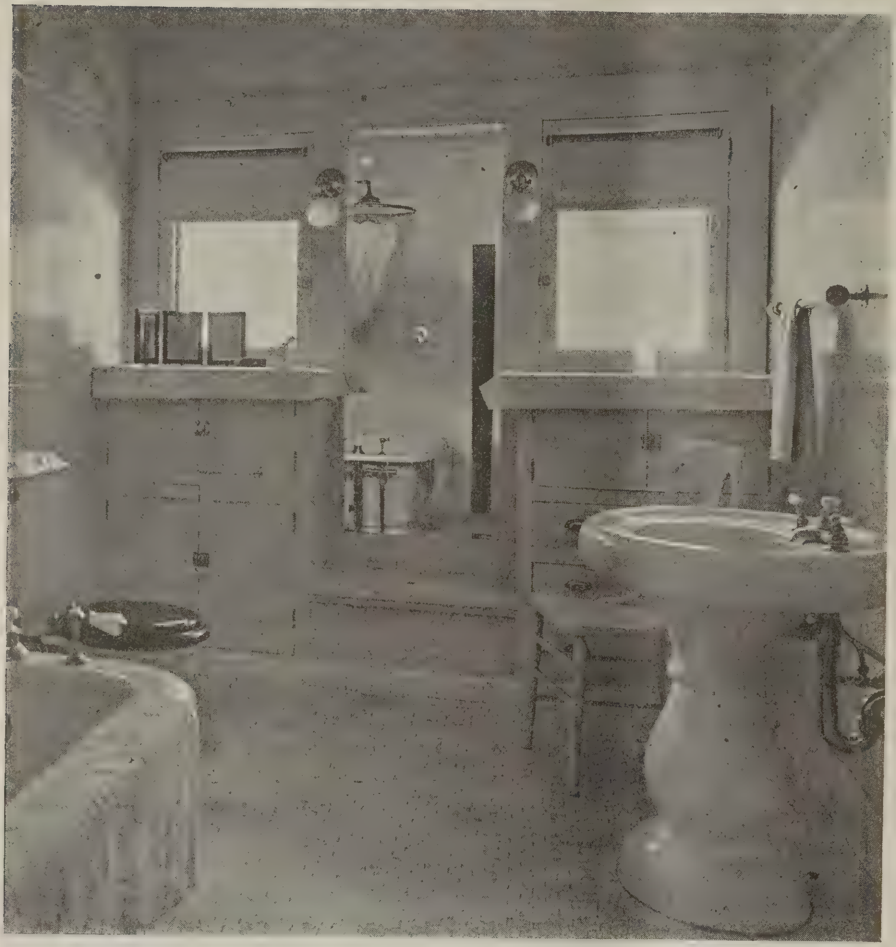
There is always room under the stairway for a closet of good size, and that space may be used for the many things that suggest themselves —hats and coats, the larger toys, temporary storage, etc.

Many small houses are resorting to the use of what may be called a "utility room." This is a room provided on all sides with alluring closets that convert it to various purposes as required. The door-bed is indispensable here. The room may serve in the day-time as a dining room, leaving just a kitchen unit as above described for daily use, and the utility room for more formal occasions. Other combinations will suggest themselves.

An interesting development of this is a device for bungalows and other small places which converts one room into four. The equipment resembles a large cylinder seven feet in diameter, seven feet high, revolving around an axis upon a ball bearing floor ring.

It is set in the wall and is divided into four segments, each of which contains the essential equipment for a room. The typical arrangement includes kitchen with complete plumbing, sink, hot and cold water connections with air tight revolving joints designed to revolve with the device; icebox with drain to sink, space for dishes, small range, etc. A bedroom with standard recess balanced lift bed. Library with desk, book cabinet and storage compart-

Another Kitchen with Wood Closets Instead of Metal



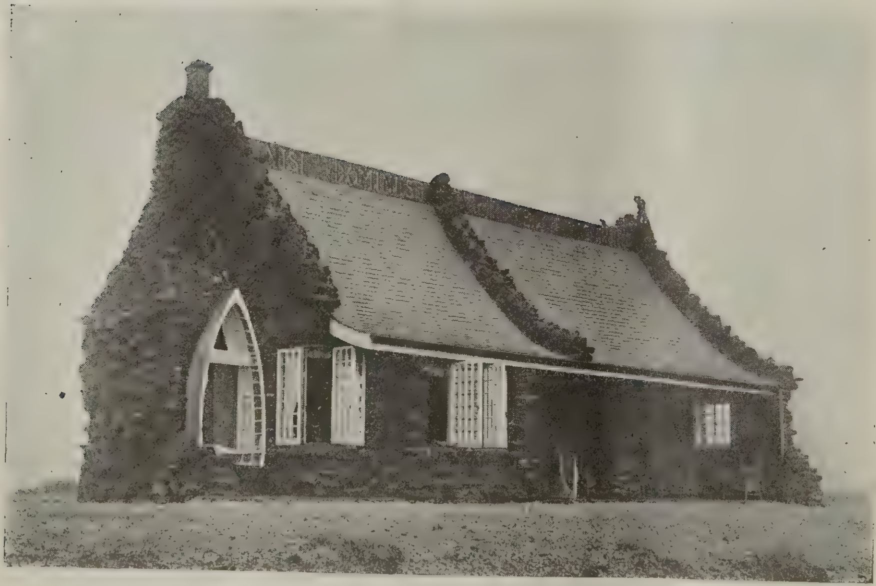
Bathroom closets are never in excess of the needs. The arrangement of drawers and doors here is good.

ments. Other types providing two "bedrooms" instead of the "library" may be had.

While such an installation rather corrupts the idea of what home should be, it will be readily seen that there are many situations where it would be very useful, and it certainly serves a purpose of economy, both of space and money and labor.

What might be called a revolving dumbwaiter is also convenient in the small house, located between the kitchen and dining room. It is filled from the kitchen by an unpresentable maid, turned half way around and emptied by the housewife in the dining room.

In houses where there are young children, it is desirable to have their bedroom connect with the mother's through a small passageway which might be utilized for an extra lavatory, medicine closet, towel rack, etc. Medicine cabinets both for this location and in the bathroom are most sanitary and satisfactory if made of steel, finished in white enamel both inside and out. There should be either steel or glass shelves. A construction of this sort neither warps nor shrinks and may be readily cleaned. A plate glass mirror is desirable on the door. Cabinets like this may be had ready made in several sizes, either to recess in the wall or to hang outside.



Quaint, unusual, distinctive, as befits the summer seashore home of a queen. Note the entrance.

Queen Mary's Bungalow at the Sea Shore near Sandringham, England

Unemployment Costs Building Trades Half Billion Annually

Hoover's Committee Blames Inefficient Management and Wasteful Union Regulations for Present Conditions

HALF a billion dollars a year in wages is being lost in the building industry through unemployment, it is asserted in a report made public by the Committee on Elimination of Weste in Industry of the American Engineering Council, appointed by Herbert Hoover. Lack of work is declared to be the outstanding fact in this industry, whose critical condition following the war is attributed primarily to high costs of construction.

The chief sources of waste in the building industry are, according to the report, irregular employment, inefficient management and wasteful labor regulations.

Analyzing the causes of building waste, the report says irregular employment is due to seasonal fluctuations, bad weather, strikes and lock-outs.

Inefficient Management Blamed

Inefficient management is blamed on failure to furnish continuity of employment; failure to plan work in sufficient detail; lack of proper schedules to allow proper coordination of scheduling, purchasing, delivery, with job requirements; lack of standards and adequate cost methods as a means of checking production; high labor turnover; failure to use proper amount or type of equipment; general failure to develop and use a greater amount of mechanical equipment; and waste of material through ment; and waste of material through careless handling and improper plant operations.

Wasteful labor regulations, according to the report, consist of requiring skilled men to do work that could be performed by unskilled, restricting individual incentive through requiring uniform wages, limiting the number of apprentices, excessive reduction of working hours, restricting output by prohibiting the use of labor-saving devices, and jurisdictional regulations.

Additional sources of waste are failure of architects to furnish check plans and specifications, duplication of labor in estimating and often in design, and accidents which are particularly important in the building industry because of the extra-hazardous nature of the work.

"Contractors must prove to the public that they can carry on operations during the winter period as economically and substantially as during other periods of the year. To do this, contractors, labor, transportation, and material men in a locality must all get together and, after joint study of the situation, agree to reduce profits and wages an amount that will offset the increased cost of carrying on work in winter months.

"The education of the public is vital to a sensible distribution of work throughout the year. This applies equally to industrial, public, and residential construction and to household repairs and mainenance. Instead of crowding our main construction work into seven or eight months, all that can be deferred from the busy to the more idle season should be so scheduled. Owners making interior repairs and maintenance. Instead of encouraged to have this work done in the offpeak season. Old buildings to be demolished to make room for new ones, should be torn down in cold weather in advance of the new construction instead of waiting, as is often done, until the new building ought to be under way.

Strikes An Economic Waste

"Real estate dealers lease apartments usually in October and do all redecorating work and repairing at this time. An architect in New York City has stated that some 25,000 painters and paperhangers are needed during this brief period, while normally only 5,000 men are required."

The strike is one of the great economic wastes to be found in the building industry, the report declares. "The waste to the men engaged, the contractor, and the public is hard to estimate. The major causes of strikes are occasioned by demands for increase in wages, recognition of the union, decrease in working hours, and also by jurisdictional disputes.

"Incidental to these causes and often aggravating them are the working conditions, while in almost every case the prime factor is the lack of understanding and failure of the employers and the workers to get together.

"If the greatest cause, the demand for an increase in wages, could be eliminated, strikes as a factor of waste would shrink into insignificance. The remedy that suggests itself is cooperation. Management and labor must forget the sore spots of past conflicts and through wholehearted cooperation fix by proper studies a minimum wage to correspond with a standard amount of production, with additional compensation for additional output. This would furnish an incentive to the men and would give recognition to deserving mechanics.

Unions Must Cooperate

"Unions must cooperate to the extent of eliminating the flat rate for all mechanics of a trade, and to the extent of modifying the restriction that forbids mechanics to accept piece work. With definite standards fixed and with the cooperation of both parties fair incentives can be introduced.

"The most encouraging sign in the elimination of the above causes is found in what is known as the 'Philadelphia Plan' put forth by the labor element of that city.

"This plan contemplates the organization into a single body through associations, groups or committees, of each employing branch of the building industry in number at least equal to the nineteen represented in the Council of the Associated Building Trades. A heading up committee, composed of an equal number of representatives from the groups of employer and employed would constitute the tribunal or council of the building industry in Philadelphia. The plan purposes the establishment of a central bureau through which voluntarily all construction programs in the territory should be cleared, including national, state, municipal, and private work."

General failure of the building industry as a whole to develop and use a greater amount of mechanical equipment is an established fact, the report says. Greater strides have been made in almost every other industry in the application of mechanical means, it is said. Union objections to labor-saving devices is wrong in princple, it is declared, and will be relegated to the past like the restriction of output.

"With thorough cooperation of unions with employers and the development of the old guild spirit, which tends to give a man pride in the quantity and quality of his work, there is the possibility of increasing production and, by these means, of maintaining high wages yet with a resultant lowering of costs," says the report. "Lower labor costs mean more building and more continuous employment for the worker.

"Many union rules are absolutely wrong and uneconomical. Many unions have exceeded the limits of fairness, and partly because of the leaders' lack of appreciation of the fundamental need for high production, have formulated by-laws, and, in individual cases, have formulated demands that have been a tremendous factor, directly or indirectly, in the restriction of output. This has resulted in increase in cost and reduction in the demand for building. It represents, in fact, one of the great sources of waste in the building industry. This policy has reacted, resulting in widespread opposition to unions. In fact, some of the most successful building contractors employ non-union labor because of their opposition to unjust union rules and requirements.

Collusion Between Unions and Employers

"It must be recognized that the unions are by no means alone in their restriction of output. The contractors and builders and supply dealers affect the situation to as great a degree indirectly by maintenance of high prices, collusion in bidding, and unfair practices. Collusion between unions and employers also has sometimes raised prices unduly."

Despite the restrictive action of many of the union regulations, says the report, there is growing evidence of willingness to cooperate. Philadelphia and San Francisco are cited as cities in which cooperation is evidenced. In Cleveland cooperation in tile setting, it is said, was hindered by employers. Cooperation in the needle trade of Montreal is pointed to as an example for the building industry.

Enormous losses are suffered through accidents, the $30,000,000 paid yearly to insurance companies for compensation and liability insurance by no means representing the total lost, according to the report, which adds:

"In the opinion of one of the best authorities in the country the actual cost of insurance represents not more than 25 per cent. of the total economic loss, which brings the total cost due to accidents in the vicinity of $120,000,000 per year, a staggering total."

Lost Time Accidents

In Massachusetts during one year accidents caused a loss of time of 485,486 days. In New York State, where four times as many workers are employed in the factories as are employed in building and construction work, there were more fatalities due to accidents in building than in factories during a four year period.

Accidents, it is stated, are largely caused by carelessness of the workmen, or lack of ordinary safeguards. Conditions which would not be tolerated in a factory for 24 hours are found on every job, it is asserted.

Great savings are possible, says the report. "An official of a large insurance company believes that by proper safety measures the waste due to accidents can be reduced 75 per cent. to 80 per cent. in from two to five years of honest effort, and that construction labor cost can be cut three per cent. by these measures. Another official estimates, from actual accomplishment in safety measures, that a total of more than 12,000,000 days a year could be saved the industry by the application of safety methods."

Architects, the report says, frequently cause expensive delays and occasionally complete shutdowns by failure to deliver detail plans at the proper time. The waste of time and energy and money through duplication of estimates and of designs, it is declared, runs into the millions every year. An equal, if not greater source of waste is said to be the duplication in figuring quantity by all bidders.

The report, which says that both government and state records were found sadly at fault in quantity, kind, and accuracy of data, concludes:

"The most encouraging feature in the building industry today is the action of a few of the builders and a few groups of building trade workmen in making intensive studies of the causes and remedies for irregular employment and haphazard conditions of work. Along with that is the growing appreciation on the part of both labor and management that to build more buildings and maintain high wages it is necessary to attain greater productive capacity per man.

"They see as proof of these facts that the 1921 depression was caused and extended by too high costs of all products, and that business, either in manufacturing or in building industries, is improving only as the costs of material and the cost of labor are reducing. All are recognizing, in fact, that no progress can be made without greater and greater attention to the elimination of waste.

Cleaning Down Stone Buildings

A WRITER in a contemporary gives suggestions for the cleaning down of buildings in portland stone, gained from actual experience over a wide area.

He states: "In the first place, well scrape and dandy-brush down the whole of the work to remove all loose particles of dust, soot, etc., that may be adhering to it. Wash off as much as possible of the dirt and stain with 'strong stuff,' that is, water containing soda in solution, and rinse down with clean water. Then obtain some 'Hollington' stone and break it into convenient sizes for use to suit the work, the smaller pieces of suitable shapes being required for the moulded work, if any.

"The rubbing down consists of rubbing well the portland stone with a piece of Hollington and water, which cuts into the face of the portland just sufficiently to remove the dirty stains and smoke grime. No sand in the rubbing down process is required. After sufficient rubbing the work may be sponged off, when the portland stone will present quite a new appearance."

Lumber Sizes for Forms

FOLLOWING sizes are used for concrete forms:

1-in. stock, dressed to 13/16 in. for floor.

1 5/16-in. dressed planks for columns and walls and beam bottoms.

1¾-in. planks for beam bottoms.

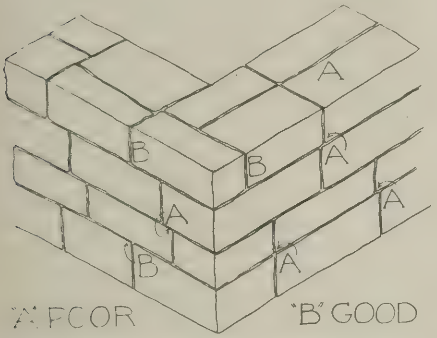
How and When to Use Stone for Foundation Work

By JOHN UPTON

IN SOME cases the most economical foundation for a building will be stone, for where they are plenty and close to the work so that the cost of hauling is not great they are actually and comparatively cheap.

The labor on a stone wall may be more expensive than that for a wall of concrete for the same use, but this may be offset by the cost of cement, sand and forms. There has always been considerable stone used and will always be so long as we shall build.

The simplest foundation is piers or butments placed on top of the ground at distances of a few feet, but even in this there is a chance for good or poor work. When one stone is put on another, the lower one should have the flat surface on top, but it is often placed the other way. These butments are sometimes allowed to extend out beyond the sill which they support. This should not be for it will let water run in under the sill and cause decay. The top stones should not project, though the under ones may do so to give more bearing.



Good and Poor Stonework.

The simplest wall is called a single wall and is merely one row of stones in width, though it may have several courses. Such a wall is not suitable for cellars, though it is all right for barns or porches where there is to be a concrete floor. Stones of almost any size and shape are used so that they make a wall fairly even on the outside.

Simple as this wall is one can use some judgment in making it, for the vertical joints should not come over each other, and all stones are so placed as to lie on their natural beds. These rules apply to all classes of walls. Another point is that the corners must be bound together, by laying one stone each way, not one above the other. The best of stone may be so used as to make a poor wall or even poor stone may be built into a fairly good wall.

Then again a wall may have a good face and look all right from the side and yet not be well built. In a double wall, that is one faced up straight on both sides, there may be but few if any stones reaching past the center and these may not bind the two sides tobether. Walls have split through the center lengthwise because of this defect, being in fact two single walls rather than a double.

Stonework Below Grade

For a house cellar the part below the grade line may be of rough stone laid up in random courses and some large stones may be allowed to go clear across the wall to bind it. These are called headers or through stones.

Above the grade line the stones are often a better grade and are squared and dressed more or less, unless they are cobbles.

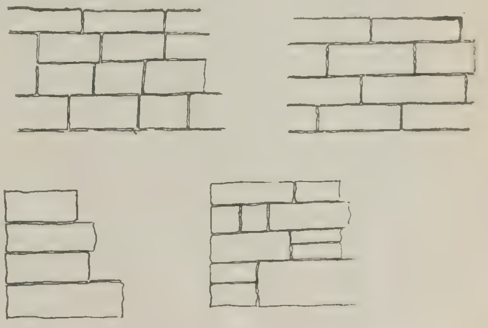
If the upper wall is to be coursed it will be necessary to stop the lower one and level it at some point so as to allow for a certain number of courses, depending on their thickness.

In leaving openings for windows, avoid joints in the wall just under the corners of the frames. In this upper part there should be no stones reaching entirely through the wall. They may go almost through and have a small stone put in to fill out, and many should go past the center and lap onto some from the other side, but frost will come in through those which reach all the way through, so avoid them.

A sort of wall which will work well with almost any stone is built by setting up forms at the bottom for the inside, and using small stone and concrete here and the larger stone on the inside till the surface of the ground is reached. Then the forms are set up on the outside and the larger stone used on the inside face. This gives a smooth wall for the most of the inside and a good surface above ground, which may readily be finished to the desired level and line for the sills.

If desired the outside may be veneered with cobbles. They should have some sand around them next the forms to keep the mortar back from the face, and may have some bent wire tires to bind them to the main wall.

Where the inside is rough it may have a good coat of plaster in being pointed up.



Left—Poor joints. Right—Good joints.

For mortar one may use all cement without lime, but a lime mortar with some cement mortar added makes the most satisfactory kind to use, as it is strong but does not set too quickly. While one should use as much as needed it should not be used to excess or so as to form large joints, for the stone is stronger than the mortar.

WHEN you make a good showing on a job, Mr. Builder, whether it be large or small, whether it be handling men, material or equipment, whether it be planning, estimating or developing—talk about it. It gives you prestige and it helps your fellow builder, who in turn may be able to help you.

BUILDING AGE is a library of information on up-to-date practical building methods. You get good ideas from the other fellows' stories about their work. Give them yours and we will go a long way toward plugging up the half billion dollar loss in the building industry.

Legal Department

A Contract Invalid for Fostering Monopoly of Labor

THE decision of the New Jersey Court of Chancery in the case of Lehigh Structural Steel Co. vs. Atlantic Smelting & Refining Works, 111 Atlantic Reporter, 376, is apt to remain one of the most important judicial precedents in the United States on the subject of closed-shop agreements between employers and employees.

The court annulled an agreement which purported to bind the members of the Building Trades Employers' Association of the City of New York to employ only union men in their various building enterprises. Hence it was decided that a strike ordered as a means of enforcing this invalid agreement was illegal.

The opinion expresses the attitude of the courts of the country toward agreements which tend to exclude non-union labor from the field of employment, saying:

"The principle of the closed shop, i. e., the monopolization of the labor market, has found no judicial sponsor. In whatever form organized labor has asserted it, whether to the injury of employer, or to labor, or to labor unions outside of the fold, the judiciary of the country has responded, uniformly, that it is inimical to the freedom of individual pursuit guaranteed by the fundamental law of the land, and contravenes public policy. On the other hand, public policy favors free competition, and the courts have been keen to recognize the right of organized labor to compete for work and wage and economic and social betterment, and to use its weapon, the strike, to realize its lawful aspirations, but none has gone to the length of sanctioning a strike for a closed shop, which has for its object the exclusion from work of workmen who are not members of the organization. There is a wealth of literature and authority upon the subject in England and in this country."

ALL readers are invited to ask any questions that will help them solve any legal difficulty that they may be in. Our legal adviser will answer direct by mail and give his opinion as to the correct procedure. Questions and answers of general interest to the trade will be published in these columns. All inquiries must be accompanied by the name and address of the correspondent so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nome de plume. Remember that this service is free to subscribers. Address Legal Department, Building Age, 920 Broadway, New York City.

Rights Pertaining to the Extension of Party Walls

THE decision of the New York Supreme Court, Appellate Division, in the case of Herrman vs. Hartwood Holding Co., 183 New York Supplement, 402, is instructive on the subject of an adjoining property owner's right to carry a party wall higher without the consent of his neighbor.

Plaintiff owns a four-story house on West Seventy-first street in New York City. Defendant owns an adjoining lot, and a party wall exists on the line. Defendant constructed a 14-story apartment hotel of steel and concrete. The foundation of the hotel is deep and supports the party wall. A wall of the hotel abuts upon the party wall, except where a court intervenes and where the hotel wall partly rests on the party wall for about one-half story. From that point upward the hotel wall is supported by steel construction.

Claiming that his rights in the wall had been invaded, plaintiff sued for an injunction requiring restoration of the wall and for damages. Damages were awarded by the trial court, but plaintiff appealed on the ground of their insufficiency. Ordering a new trial, the Appellate Division says, among other things:

"It is now well settled in this jurisdiction that either owner of a party wall may, without the consent of the other, and at his own expense, carry the party wall higher, provided the existing party wall be not impaired thereby, and such addition thereto be so made and constructed that it may be used as a party wall by both owners. . . . The answer to defendant's contention in this regard is that it has not carried up the party wall. What it has constructed, resting on the party wall, is part of a much thicker wall of its hotel, resting on independent foundations and exclusively its own. To be sure, the defendant's building, standing on the wall as thus carried up by it, has some resemblance to a party wall; but it is manifest that it would not stand independently, if plaintiff should remove the party wall now apparently abandoned as such by defendant, or remain of use or value to the plaintiff as a party wall should the defendant's building be removed or destroyed. Such use of the party wall for a new and entirely different building was unauthorized."

Referring to the fact that defendant had torn away parts of the party wall and inserted concrete piers and columns, and that the space around the piers and columns, and from which parts of the party wall had been removed, was not bonded into concrete piers, but was filled with rough stone and cement, the court adds:

"The piers and columns as thus constructed, in so far as they are in the party wall, cannot be said to form part of a party wall, for they are independent structures, erected solely for the use and benefit of the defendant, and are of no use or benefit to the plaintiff, and it is evident that, if defendant's building should be removed or wholly destroyed, a complete party wall would not remain for the protection of the plaintiff's building and for his enjoyment thereof. The acts of the defendant cannot be justified on the theory that the party wall had become dilapidated, and that it merely repaired and rebuilt it, and therefore, to the extent that the piers or columns are built over the plaintiff's line, this constitutes an invasion and permanent appropriation of his property, and to the extent that the party wall has been destroyed and weakened thereby it constitutes an invasion of his rights as a co-owner of the party wall."

It appears that defendant caused other parts of the party wall to be removed, reducing the thickness to four inches in places, and inserting water pipes used in flushing toilets. On this phase of the case the court remarks:

"Owing to the thinness of the party wall thus remaining, whenever one of such toilets in the hotel is used, the flushometer is plainly audible in plaintiff's sitting room, and throughout his house, and constitutes as to him a nuisance. This, too, is an unauthorized use of the party wall, and manifestly the party wall as such has been seriously impaired thereby. It has been held that a co-owner of a party wall is not entitled to maintain therein windows which were originally constructed therein. . . . If the use of a party wall for obtaining light, which in no manner injures the co-owner, is not a proper use, surely such ripping into a party wall and placing therein water pipes, which thus constitute an annoyance to the co-owner, is not a proper use of such a wall."

The plaintiff established *prima-facie* a right to an injunction requiring defendant to restore the wall, it is within the jurisdiction of the court, on final hearing, to allow an award of damages in lieu of such injunction, particularly on it appearing that defendant acted in good faith and under advice of counsel, and that the cost of restoring the wall would be disproportionate to plaintiff's damage.

The Supervising Architect as the Owner's Agent

IT is sometimes erroneously supposed that an owner's employment of an architect to supervise the construction of a building by a contractor constitutes the architect the owner's agent generally in matters pertaining to the erection of the structure.

The architect's agency extends no farther than is necssary to carry out his employment, excepting as broader authority may be expressly conferred on his.

It took a decision of the Wisconsin Supreme Court to convince a materialman that an architect had no implied power to bind the owner for the price of materials. The fact that the architect had been entrusted with funds to be paid to materialmen on the contractor's order and deducted from the amount to become due the contract was held to create no implication of authority to bind the owner personally for materials.

And in a Georgia case it was decided that an owner was not liable for injury to visitors in a building in course of construction on a theory that the architect was impliedly empowered to invite visitors to come upon the premises.

"He has authority," says a standard legal authority concerning the agency of architects, "to proceed in the usual way, and the employer may constitute him his agent generally for all purposes connected with the erection of the building; but apart from an agreement to that effect an architect is not the general agent of the owner, and has no authority to bind the owner by contracts for any work done upon or materials furnished for the structure concerning which he is employed." 5 Corpus Juris, 256.

Liability of Land for Improvements not Contracted for by Owner

MINNESOTA, like several other states, has a statute to the effect that if an owner of land knows that improvements are being made on his real estate without authority from him, he may avoid mechanics' liens attaching to the property by notifying those furnishing labor or materials, in writing or by posting, that the improvement is not being made at his instance.

Applying this statute in the case of Berglund & Peterson vs. Wright, 182 Northwestern Reporter, 624, the Minnesota Supreme Court holds that the interest of a part owner may be subjected to a lien for the entire cost of improvement made with his knowledge and without his giving such notice. The salient parts of the court's opinion are as follows:

"It is well settled that improvements made by one person on the land of another cannot be charged as a lien against the land unless the improvements were made at the instance or with the consent of the landowner. . . . But it is also well settled that the legislature may provide by statute that improvemnts made with the knowledge of the landowner shall be deemed to have been made at his instance unless he disclaims responsibility therefor in the manner and within the time prescribed by the statute. . . .

"Defendant knew the improvements in question were being made and did not give or post the notice provided for by the statute. He concedes that under these circumstances the statute creates a lien against his undivided two-fifths interest in the property, but contends that the statute cannot create a lien against this interest for the entire cost of the improvements, but only for the two-ninths part thereof that inured to this interest. . . .

"The purpose of the statute is to protect laborers and materialmen by giving them a lien on the property for the value of the work and material they contribute toward its improvement. To remove grounds for controversy and to make the protection intended more certain and effective, the statute imposes on every person having an interest in the property and who knows that improvements are being made thereon which he has not authorized the duty to warn the laborers and materialmen concerned that the improvements are not being made at his instance, and provides that if he fails to give such warning [within five days] he 'shall be deemed to have authorized such improvement' to the extent of subjecting his interest to a lien therefor.

"That the legislature may impose such a duty on the owners of the property for the protection of those who furnish labor or materials for its improvements, and may make the failure of an owner to give or post the prescribed notice equivalent to an express acknowledgement that the improvement is being made at his instance, is no longer an open question. . . .

"By virtue of the statute, defendant stands in the same position as if he had expressly authorized the improvements in controversy. This brings him within the rule which subjects the interest of a part owner to a lien for the cost of improvements made to the common property at his instance. The lien in question finds its support in the duty which, under the statute, defendant owed to the laborers and materialmen. Having failed to perform that duty, his interest in the property could be lawfully charged with a lien for the amounts due these laborers and materialmen."

Can an Architect Recover for Unauthorized Use of His Plans?

IF they have not been printed, can you give me any legal decisions bearing on the rights of an architect in a case where his plans have been used without his knowledge and consent for a building other than the one for which the plans were drawn? In other words, where the plans were stolen and used. W. W. S., Colorado.

As late as November 7, 1919, the Minnesota Supreme Court handed down a decision, showing that where an architect has retained ownership of drawings and specifications he is entitled to recover the value of their use, *even as against an owner who paid for their preparation for another building.*

In the Minnesota case—McCoy vs. Grant, 174 Northwestern Reporter, 728—it appeared that defendant employed plaintiff, a Minneapolis architect, in 1915 to prepare plans and specifications for a house and to supervise its construction. Plaintiff was paid $700 for these services. Afterwards defendant sold the house and engaged plaintiff to prepare the preliminary plans for another house. These were rejected as being unsatisfactory, and defendant determined to use the same plans as were used on the other house. Neither had the original blueprints, but plaintiff, the architect, had the original tracings from which the blueprints had been made. Defendant procured these tracings from plaintiff and had new blueprints made, which he used in constructing the second house.

Replying to plaintiff's suit to recover the value of the use of the plans and specifications on the second building, defendant insisted that, having paid plaintiff for his services in devising the plans and specifications for the former house, they had become his property, and he had the absolute right to make any use of them he saw fit without compensating plaintiff therefor.

The trial judge held that plaintiff was entitled to recover $300 for use of the drawings, etc., on the second house. Affirming this award, the Supreme Court said:

"Copies of the plans and specifications had been filed with the building inspector as required by the building regulations of the city in order to obtain a permit for the construction of the first house. Defendant contends that they thereby became public records and that in consequence thereof plaintiff lost all property rights in them. It is not necessary to determine the effect of such filing for plaintiff and defendant could contract that as between themselves plaintiff should remain the owner of the plans and specifications.

How Small Builders Can Use Motor Trucks and Save Money

Scheme of Co-operative Operation of Trucks That Is Worth Considering

The Possibilities of Handling Full Loads with Speed Is Shown Here

ONE of the most pressing problems to the small builder of the present day is, without doubt, the cost of moving materials. With wages so high, taxation heavy, fuel or horse fodder costly, and repairs to either carts or motors dear, transport of goods locally has become an important item of cost. Long distance journeys involving rail or steamship freight mean further increases under this heading. This, however, is a charge that has to be borne on goods coming any distance.

For the short journey, as from the local railway station or brickyard, every effort is now necessary to reduce transport costs to a minimum. Before the war such material as cinder or ash could be had for nothing at many works, and the cost of obtaining a few loads was a mere trifle of cartage cost. To-day, cinders cost just what owners like to ask for it, and, as there is none to be got in some districts, the tendency is to ask more for it each time, while the cost of bringing it to the building in course of erection makes quite a dear job of it.

The small builder can help himself, however, by paying the strictest attention to economy in all such matters. For instance, in days gone by it would not have mattered so much if half a day had been spent in a slack time to take half a load somewhere. Things are different to-day. Now, it would be better to put the horse in the stable and the man to assisting one of the mechanics on the building. The horse is doing no harm, the cart is not wearing out or running risks, and the man is earning his money.

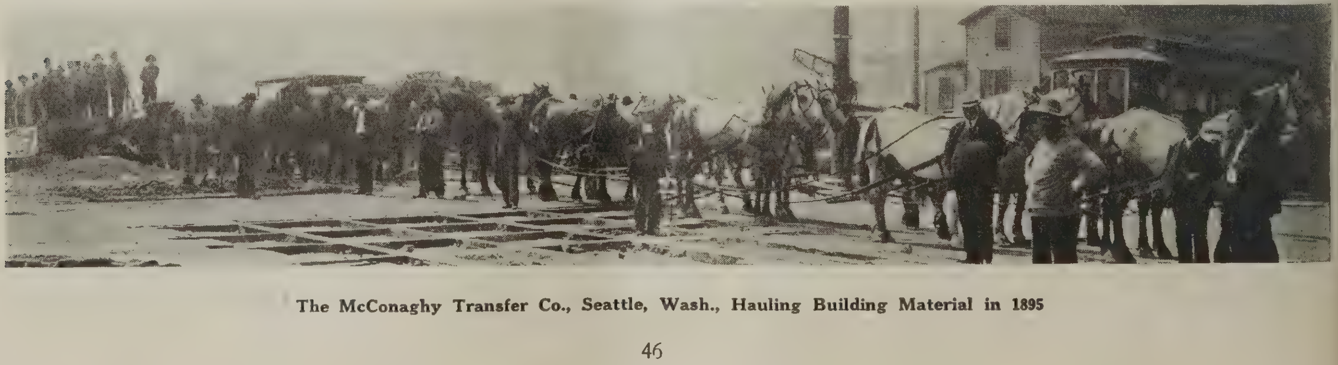
There may be mitigating conditions demanding the delivery of half a load at times, such as having men waiting for tools or materials—a sufficient reason—but the wise builder will do his utmost in these days to see such conditions do not arise more often than can be avoided. In these times it has become necessary to prevent either men waiting for goods or working on half-loads.

To the small builder it is more than ever necessary to become expert in planning work. Certainly horse and wagon equipment ought to be earning money all day, every day; but half-loads do not earn money; they waste it.

The same holds good of the motor truck, only in a more limited degree. The ideal is to run both motor-truck or horse and truck at full load all day; but in only a few cases can it be done. Too many trucks are running about empty for too much of their time, and that is the way money goes on a job. With either class of truck it is necessary to avoid "the coming back empty" cause of waste. It is sometimes better to wait until sending one load and bringing back another can be arranged, than to make two trips, the whole time of one of them being waste.

Sometimes a small builder can let his horse and cart out when not using it himself. Where the builder himself has to hire, the need for such strict economy will be imperative. At times it may be quite easy for a builder owning his own trucks to do a little cartage for others in the neighborhood.

In small country towns there may be further help in the reducing of trucking costs by the adoption of a little co-operation. Where it would pay no single builder to run a motor-



The McConaghy Transfer Co., Seattle, Wash., Hauling Building Material in 1895

The McConaghy Transfer Co., Seattle Wash., Using 3½-Ton Federal Truck with Trailer Today

truck, it may pay half-a-dozen acting collectively to do so. Between them they could buy such a vehicle and run it at a profit to themselves under certain rules and regulations faithfully observed. In nearly any case it would prove more profitable than being at the mercy of some local truckman.

Probably the best way to work such a scheme would be to subscribe the requisite capital in shares proportional to one's ability to subscribe. This sum would be expected to pay a dividend, if possible. Each subscriber would have equal claim to the service of the truck, which would be debited to him at so much a day or hour. He would pay this, and take his share of the profit at the end of the half-year.

In some districts the truck could also do jobbing work for other business houses and, if well managed, without too many empty journeys, it may prove a profitable speculation. For long trips, such as moving a load of timber from a district, say, twenty or thirty miles away, it may save much in freight, to say nothing of delays avoided.

This is the way the small builders of a town or district may help their own business, do their neighbors a good turn, and make a little themselves on the doing of it. This may be a better way than keeping several large horsed trucks, between, say, six or seven of them. The motor-truck means speed, and that means lessened costs in building. With so much up against him it is necessary for the small builder to lose no chance of reducing costs if only to stimulate trade, for although there is plenty to do, people are hanging back as much as possible on account of the expense of building.

Builders Have Learned the Value of a Motor Truck as An Advertising Medium Also

Unique Offices Advertise Business

(Continued from page 31)

Simulating a tiny bungalow, of English influence architecturally, the office of John H. Lindsey typifies an ordinary residence in front entrance porch, doorway, design of windows, and in other respects. Ordinary siding is used for the outside walls, which are painted a very pale blue, while darker blue and yellow are used as the trimming colors. The steeply pitched roof is shingled, the shingles of which are in greens, reds and buffs.

The little branch office of Edwards & Wildey, real estate dealers and home builders, is one of a number of branches of this type, scattered through different sections of Los Angeles. The walls are of deep-cream cement-stucco, with black and orange trimming, and the roof is of wood shingles in variegated colors.

The branch office of the C. C. Albright Company, real estate dealers, presents a novel appearance. The very steeply pitched roof is of wood shingles, painted a slate color, and the outside walls are of wide weather-boarding, painted tan, while the trimming is done in green. The building is patterned after a small residence, but quite dwarfed in dimensions.

It is to be noted that in every instance a home is suggested to the passer-by, and that, of course, is the thing for which the particular business stands.

Each type illustrated here was expressly designed and built for the particular business for which it is used. They help to advertise the business conducted in them.

Short Cuts in Estimating Costs

Practical Builder's Suggestions Simplify Work of Figuring Cost of Small House Construction

By I. P. HICKS

IN ORDER to show how to make some practical short cuts in estimating that can be depended upon as being reliable we will present the plan of a five room bungalow and follow it up with the estimate; showing how the estimator may make the combinations to fit the job he is figuring.

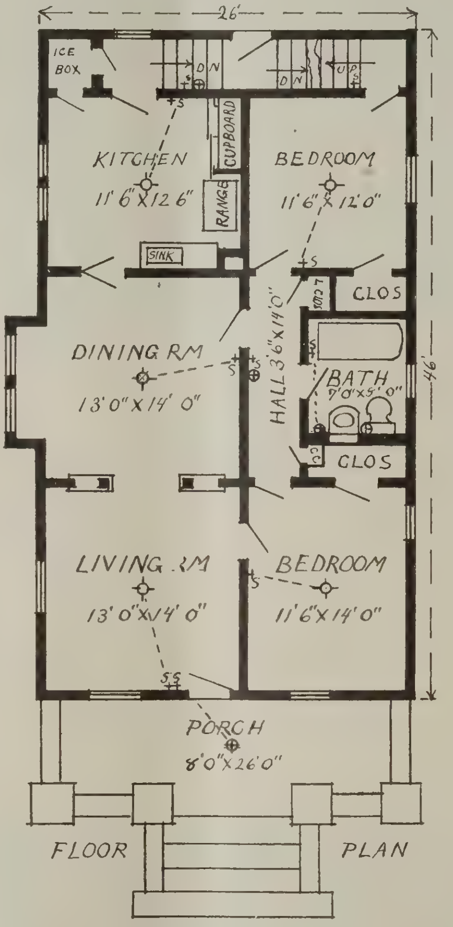
There is no way by which one can lump an entire job off with any assurance of accuracy; for it is utterly impossible to average up plumbing, heating, electric wiring, mason work, plastering and painting with the lumber, millwork and carpenter labor. But these items can be singled out and classified in a way so that some of them can be combined in a way that will make it practically safe to estimate them in a lump without going into all the details of the estimate.

In order to make our plan of estimating clear and plain we must have a material and labor price list upon which to base the estimate. In the estimate which follows the labor is figured at $1.00 per hour and the material at the following prices:

Framing lumber per M	$ 50.00
Sheathing and shiplap	45.00
Western white pine finish	100.00
Ceiling, clear ⅝ fir	58.00
Siding, ½x4-inch cedar	60.00
3-inch edge grain Y. P. flg	110.00
3-inch flat grain Y. P. flg	70.00
4-inch edge grain fir flg	90.00
⅞x2¼ face clear P. R. O.	150.00
Yellow pine finish	100.00
Shingles, 5 to 2 clear cedar	7.00 per M.

We are now ready to make the estimate and will begin with excavating and mason work.

Excavating, 226 cubic yards, 75c	$169.50
Concrete footings, 150 cubic feet, 40c	60.00
Hollow tile building blocks, 2,218 5x8x12 laid in wall per 100, $11	243.98
Porch foundation, 140 5x8x12 blocks, $11	15.40
Chimney, 8x12, 33 lineal feet, $1.50	49.50
Stone caps, 2 5"x24"x24", $1.50	3.00
Stone caps, 2 5"x30"x30", $2.00	4.00
Coping, 2 pieces 5"x14"x4'-3", $2.50	5.00
Coping, 2 pieces 4"x14"x5'-0", $3.00	6.00
Coping, 2 pieces 5"x14"x5'-8", $3.40	6.80
Steps, 3 7"x15"x8'-0", $5	15.00
Steps, 1 7"x15"x14'-2"	7.00
Chimney cap, 1	2.00
Total, excavating, foundation and chimney	$587.18



Plan of Hypothetical House

FIGURING THE FRONT PORCH.

2 squares 2x8 porch floor framing with ⅞x3¼ face clear fir porch floor, $24	$ 48.00
2 squares 2x4 porch ceiling framing with ⅝x3¼ face clear fir ceiling, $13	26.00
No. ¼ squares of 2x4 roof framing with sheathing and shingling, $19	61.70
3 squares of porch rail and column framing, $5	15.00
54 lineal feet porch cornice, 85c	45.50
30 yards of stucco plaster on porch, $1.40	42.00
Total cost of porch above foundation	$238.20

The actual floor space of this porch is 208 square feet. Dividing the cost above the foundation, $238.20 by the floor space 208 square feet, we obtain approximately $1.14½ per square foot of floor space for the cost of this porch above the foundation. This includes all but the gutter, painting and the foundation work. It is best to figure the last three items separately and add the cost to the above because some are put up with gutters and some without; if stuccoed there is much less painting and if only piers are built for a foundation there is much less of the mason work.

By keeping a record of the cost of porch work on different kinds of porches the contractor should soon be able to accurately figure the cost of porch work by the square foot of floor space, which is the only practical way to make a short cut in estimating.

We will now estimate the building above the foundation:

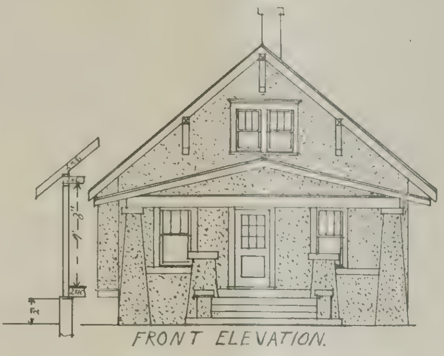
12 squares 2x10 floor framing with 1x8 shiplap rough floor and plain red oak finish floor, $48	$570.00
12 squares 2x6 ceiling framing, $6.80	81.60
7 squares 1x8 shiplap attic floor, $8	56.00
22 squares main outside wall, 2x4 framing and 1x8 sheathing, $13	280.00
244 yards stucco plastering, $1.40	341.00
21 squares main roof, 2x6 framing, 1x8 sheathing and 5 to 2 clear cedar shingles, $23	483.00
180 lineal feet main cornice, 75c	135.00
12 1-3 squares 2x4 partitions, $7	86.33
1-3 square 2x6 partition, $9	3.00
4 cellar steps to grade landing, $2	8.00
Landing	4.00
8 steps, grade landing to cellar, $1.25	10.00
15 steps to attic stair, $2	30.00
4 single windows finished in oak, $18	72.00
1 twin window finished in oak	36.00
1 front door finished in oak	47.00
5 inside doors finished in oak, $26	130.00
1 colonnade opening in oak	70.00
3 single windows finished in yellow pine, $14	42.00
1 twin window finished in yellow pine	28.00

1 single attic window	10.00
1 twin attic window	20.00
1 outside grade door, yellow pine trim	25.00
6 inside doors, yellow pine trim, $18	108.00
Refrigerator work	20.00
Oak base, 88 feet, 25c	22.00
Yellow pine base, 270 feet, 15c	40.50
Oak picture mold, 118 feet, 12c	14.60
Yellow yine picture mold, 110 feet, 10c	12.10
Kitchen cupboard	50.00
Linen closet	20.00
Clothes chute	8.00
Closet shelves	4.00
Total	$2,867.13
Plastering, 530 yards, 75c	371.00
Total	$3,238.13

So far we find the cost to be $3,238.13. The actual square feet of floor space for the first floor is 1,196. Dividing $3,238.13 by 1,196 feet we find the cost to be approximately $2.70¾ per square foot of floor space.

Now after establishing the rate as we have; if we had a similar job to estimate we could proceed as follows for the complete estimate.

Excavating, foundation and chimney	$ 587.18
208 square feet front porch, $1.14½	238.16

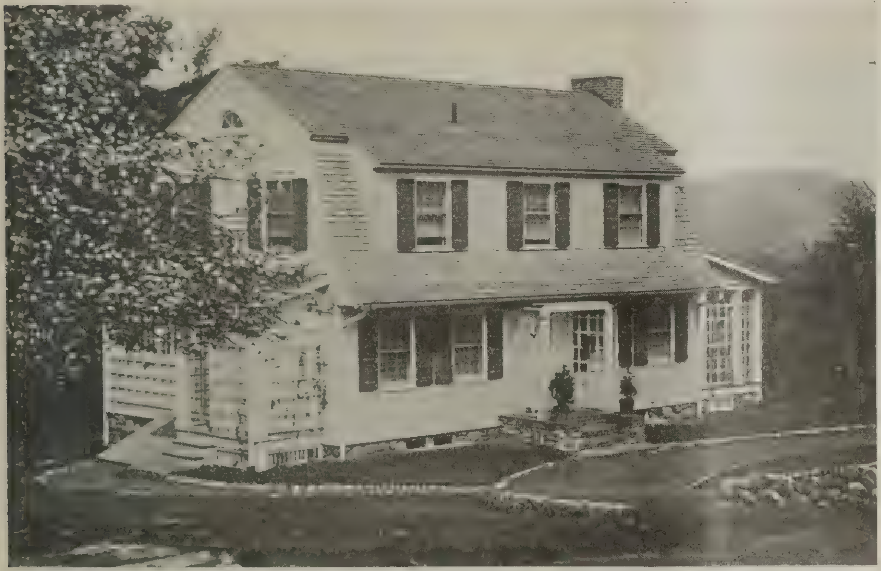


Plan of this house on previous page.

1,196 square feet main floor, $2.70¾	3,238.17
Plumbing	425.00
Electric wiring	75.00
Painting	160.00
Heating (furnace)	280.00
Gutters and tin work	40.00
Incidentals 5 per cent. of the above amount	252.17
Total estimate	$5,295.68

There seems to be a particular dislike among the carpenters and contractors to get right down to the actual work of estimating everything in detail for it is often a long and tedious job. In the above we have given a method and a system by which every carpenter and contractor can work out a method of shortening the work very much and in a way that they can depend upon. Keep a record of jobs and figure out what each job costs per square foot of floor space and soon you will have the best information obtainable for making estimates, either by short cuts or otherwise. Rates per square foot can be worked out with great accuracy, including the material and labor, and, if prices change, it is comparatively easy to work out a new rate to conform to changes as they may arise from time to time. The prices we have given in this estimate are more to show the system than as a criterion of prices.

We invite practical talks on practical building from our practical builder-readers.—Editor.

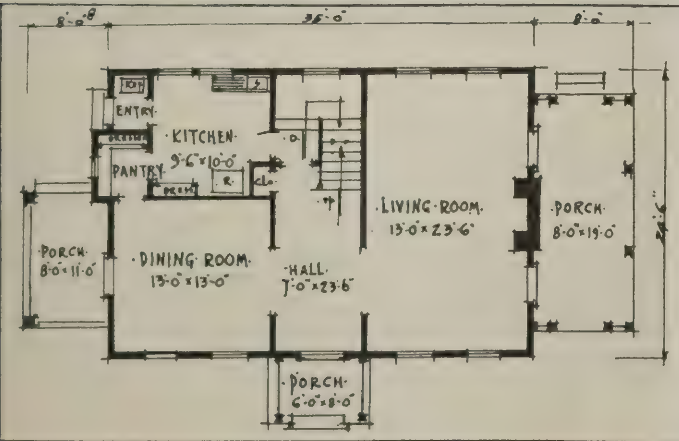


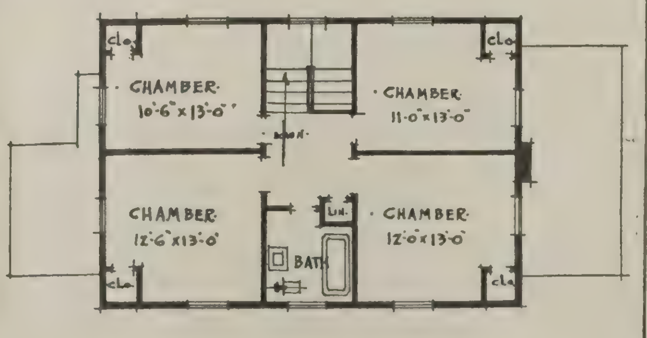
Dutch Colonial House

Cragsmere, N. J.

Leo Bugg Realty Co.

THE cellar is fully excavated and has a cement floor. Wide siding painted white with green shutters. Living room extends across the side of the house and has a fine rubble stone fireplace. The entire interior is finished in white with mahogany doors. Hardwood floors throughout. Steam heating plant. French doors from living room leading to porch.





House of Emile R. Weadon, Malverne, Long Island, N. Y.

Your New Houses—

Live Selling Points That Are Often Overlooked by Builders—Part That Property Location Plays in Quick Sales

THE house of Emile R. Weadon is an attractive type of suburban bungalow. The roof treatment is a bit unusual and gives rather pleasing variety.

LOGICALLY the first step in the planning of a house must inevitably include the selection of a plot of desirable ground. When making this selection the builder instinctively knows the advantages of one piece of property over another and he selects his locations accordingly.

What often happens, however, is that the same builder does not take the greatest possible advantage of this knowledge when it comes time to sell his house. Frequently he lays stress on unique features of design and construction. In so doing he does not appreciate that unique construction or unusual layout does not make a universal appeal. What pleases one does not impress another. Why waste time therefore in pointing out cosy breakfast nooks, sunporches, living rooms, fire places and in talking about water proof cellars, rigid construction, winter warmth, when the other builders in all probability have houses that are just as waterproof and breakfast nooks that are just as "comfy" as the other fellow's?

There is one big feature that a good builder can sell that carries a stronger and more general appeal than good design and construction, and is bound to make his house more desirable than his competitors, namely, location.

The present cost of the property must not be too great because the buying public is more and more recognizing that home-building and home-buying are, or should be, business propositions. Any item that adds cost to the house without adding real value is not good business. Furthermore, the home buyer will not put into his house more than he can financially afford. He *will* sacrifice somewhat in order to own a home but he will not pinch on the necessities of life to meet large overhead expenses. And he does not want the builder to skimp on materials or workmanship to compensate for a high cost of the land. He wants to be shown that the plot does not add too great a burden to the cost of the developed property.

In the central sections of the large cities, it is natural that the desirable spots for homes are so high in price that they are beyond the reach of the majority. Moreover the congestion does not provide the ideal surroundings for a home. When the buyer thinks of a home he likes to picture a place bright with refulgent sunshine and swept by cooling breezes in the summer time; and yet, not so far away from the center of business activities that it can not be reached quickly and conveniently.

Residence of William Millard, Malverne, Long Island, N. Y.

Because of these demands there is a strong tendency toward suburban development. In selecting the best suburban property for his home, the buyer is confronted by the second consideration, namely, the probably future value of the developed property, inasmuch as this effects very materially its future desirability and selling value.

How to Sell Them

By CARL B. EIMER
Former Secretary
Long Island Real Estate Board

A MIGHTY good example of a simple and beautiful suburban bungalow is this house of J. M. Clayton. Good houses like this one are to be encouraged.

Home of J. M. Clayton, Malverne, Long Island, N. Y.

Bungalow of Bert Wheeler, Malverne, Long Island, N. Y.

No man is so rich that he can afford to build or buy a home that will ultimately depreciate in value. It is of the utmost importance, therefore, to choose a place to build where there is reasonable certainty of enhancement in realty values. Such values are increased only by natural development; there is no divine hocus-pocus that will transform a farm into valuable city lots.

Increased values are brought about by two main factors,—transportation and increased population. It is, therefore, wise to select a location, not only where the class of homes being built are desirable and where land is reasonable in price, but also where the future holds forth the probability of continuous improvements in transportation population and business activity in general.

To buy in a neighborhood that has seen better days is like buying a gold mine that has been pretty well worked out, and it often occasions the future loss of good hard earned money with its attendant mental distress.

To sum up briefly, therefore, the home buyer wants a house in a desirable location that is reasonably accessible to the business activities of the community. Its first cost should not be excessive, but it should have the possibilities of becoming a valuable piece of property at a future time, as the community grows and further improved transportation makes it even more desirable, as a place to live. He wants it convenient to the schools for his children, to the "movies" for himself and family, to the churches,—for, if he doesn't go himself, he at least likes to know that there is one nearby. There are many other things that he wants near him. These include, a bank, a butcher, a grocer, a drugstore, newspaper, mail, milk and laundry deliveries. He wants sewer, water, electric, and gas connections, room enough on his property for a garage and driveway.

Wooden Words

He used to BOARD at Mary's house
And she was TRIM and neat.
He had to PLANK his money down
For STAKES she served to eat.
He often used to BEAM on her,
And GIRDER as he kissed her.
And she would SHUTTER lips real tight
And swear she'd be his sister.
She'd really COLUMN down sometimes,
When he WOOD start to STRINGER.
She didn't TRUSS him very far
He'd often STAIR-RAIL hard at her,
Until she started scolding.
And then his love grew very cold,
In fact it started MOLDING.
Now, when she wears her pretty SASH,
His heart no longer tingles.
And in the end she'll shake him flat,
Because he has the SHINGLES.

—*Wood Construction.*

Subdividing Large Rooms for Small Meetings

Different Types of Movable Partitions and How to Install Them

By **E. J. G. PHILLIPS**

THE present day Sunday school methods have had a decided bearing upon the design of church and Sunday school buildings, in some cases even leading to the erection of separate buildings for Sunday school purposes. This, however, can only be done by a very small percent of churches. The large majority must depend upon other less expensive means for providing the facilities required by which the regular church auditorium and galleries are used for Sunday school purposes as well as special rooms provided for exclusive Sunday school use.

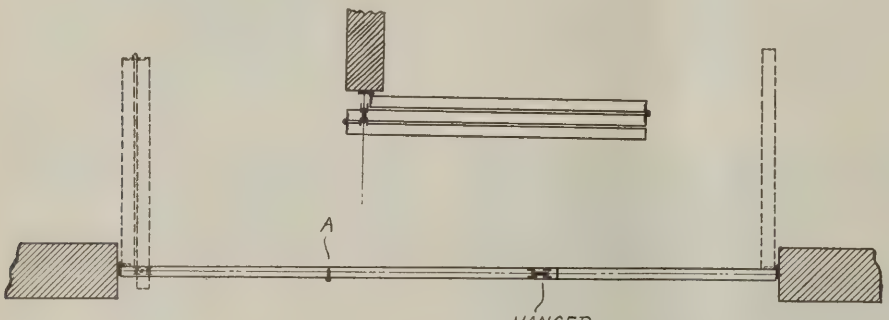


Fig. 1—Simple Form of Folding Partition

The departmental organization, the organized class movements, the introduction of graded lessons and improved teaching methods in use, have all cooperated toward demanding separate rooms for certain departments during all or most of the service and special rooms for the classes during the teaching period.

When erecting new churches these rooms are usually provided in an annex to the main auditorium either with or without a balcony. The balcony and the space below the balcony make splendid places to be divided into separate class rooms by the use of movable partitions composed of sliding or folding doors. The balcony of the main auditorium is often provided with partitions, leaving the front open.

The folding and sliding door partitions can often be installed in old buildings with little difficulty and at an expense which is small in comparison to the advantages gained. A very simple folding partition is shown in Fig. 1. This finds its greatest application in places where the entire front of small rooms with permanent side walls are to be opened toward the larger assembly room. This particular opening is closed by three doors, two folding to one side and one toward the opposite side. The two doors at the left are hinged together and to the jamb. The side of door 2 farthest from the jamb is supported by a hanger. The door at the opposite side can be used as a passage door to enter or leave the room without disturbing the entire partition.

Doors eight or nine feet in height should not materially exceed three feet in width and for that reason varying numbers of doors should be used. Floor guides and tracks are not absolutely necessary when only two doors are joined in a section, but should be used when three doors are hinged together, and in all cases assist in stabilizing the partition. Considerable care must be used to locate the floor guide exactly beneath the center of the hanger pendent bolt as well as to dress up the sides of all the doors parallel and square before applying the hinges in order to prevent binding when folding the doors. Either floor bolts, ceiling bolts or cremone bolts are used in joints *A*.

The doors which are hinged to the jamb are slightly narrower than the other doors, by a distance equal to the distance from center of hinge pin (Fig. 1) to the face of door plus half the thickness of the door plus the distance from the center of the hanger pendent to the edge of the door. Table I gives the data regarding thickness and weight of doors, size butts and difference in widths of doors.

To determine the width of each door, when doors open toward one

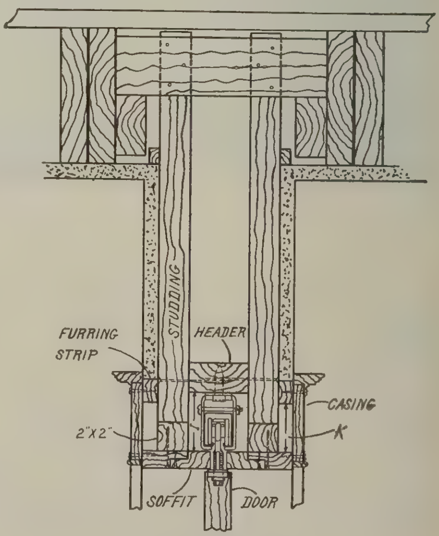


Fig. 2—Vertical Section Showing Method of Hanging Doors

TABLE I.

Data Applying to Folding Partition Doors in Pairs.

Thickness of doors.	Wt. of door.	Hanger No.	Size of Butts.	Center of hinge pin to face of door.	Top of Soffit to header.	Top of door to top of Soffit.		Difference in widths of doors.	H	J
						7/8 in. Soffit.	1 1/8 in. Soffit.		H	J
ins.			ins.	ins.	ins.	ins.	ins.	ins.	ins.	ins.
1 3/8	75	135-0	3 x 3	1/4	3 1/8	1 1/8	1 3/8	3 5/8	3 5/8	7 1/4
1 3/4	100	135-01	3 1/2 x 3 1/2	1/4	3 7/8	1 1/8	1 3/8	3 5/8	3 5/8	7 1/4
2	125	135-1	4 x 4	1/4	3 7/8	1 1/8	1 3/8	3 3/4	3 3/4	7 1/2
2 1/4	125	135-1	4 x 4	1/4	3 7/8	1 1/8	1 3/8	3 7/8	3 7/8	7 3/4
2 1/2	250	135-2	5 x 5	3/8	5 1/4	1 1/8	1 3/8	6 1/2	6 1/2	13

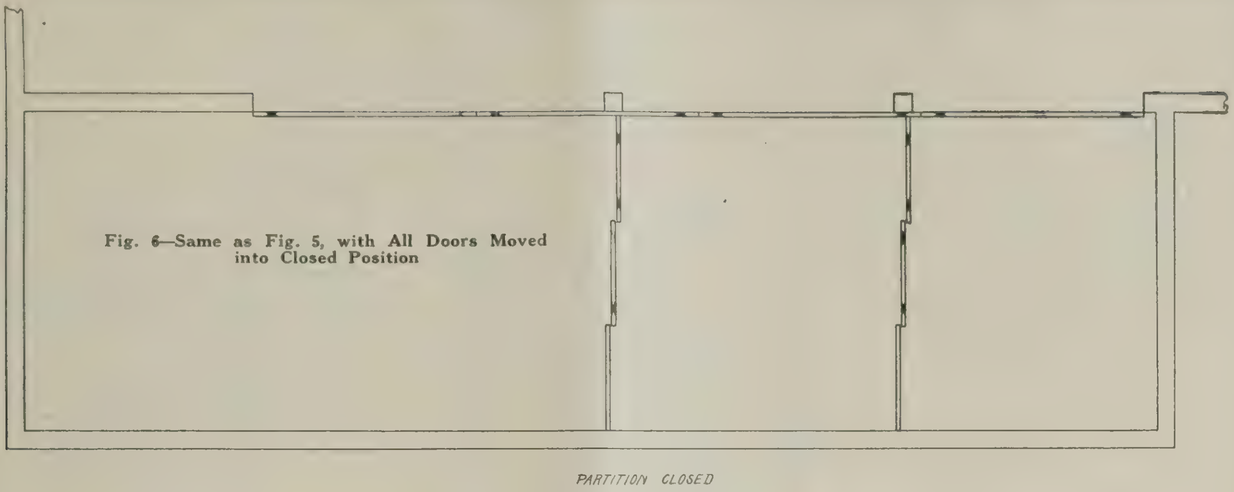


Fig. 6—Same as Fig. 5, with All Doors Moved into Closed Position

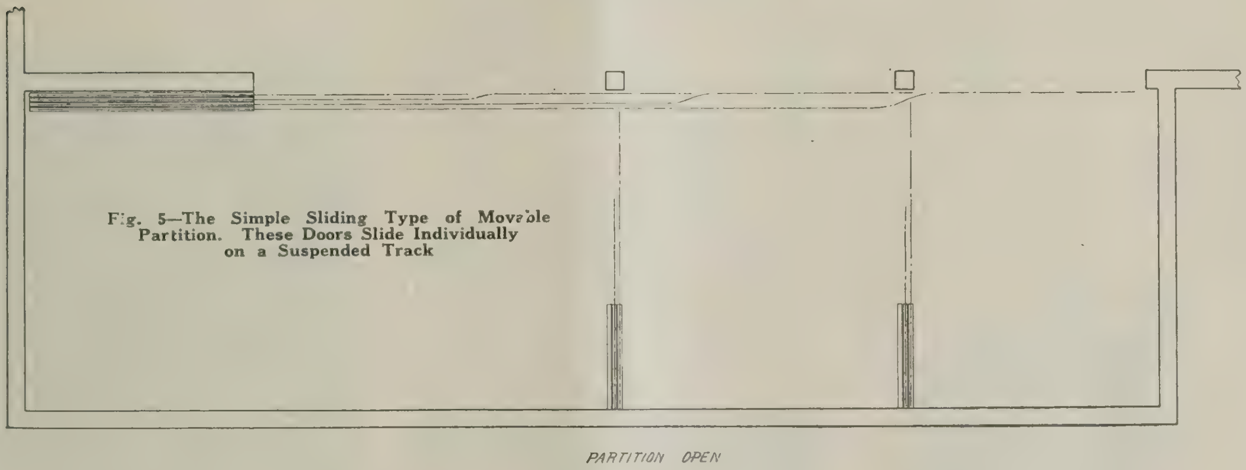


Fig. 5—The Simple Sliding Type of Movable Partition. These Doors Slide Individually on a Suspended Track

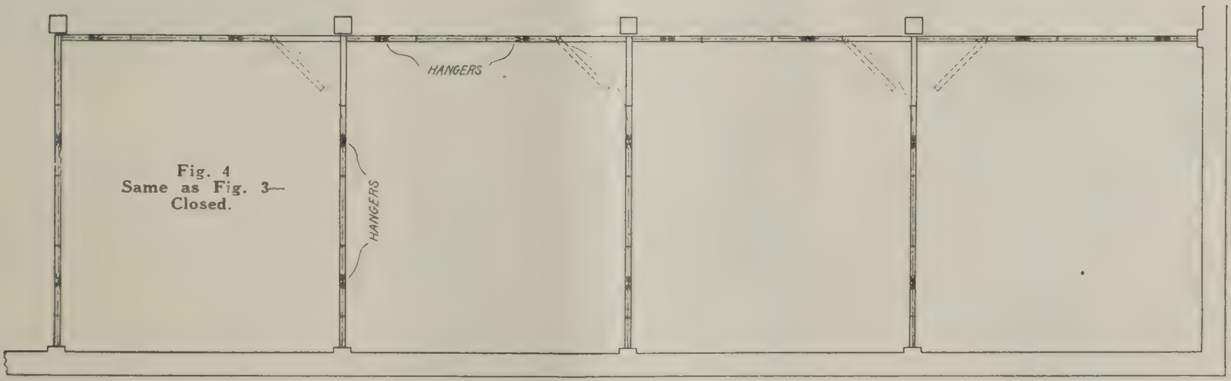


Fig. 4
Same as Fig. 3—
Closed.

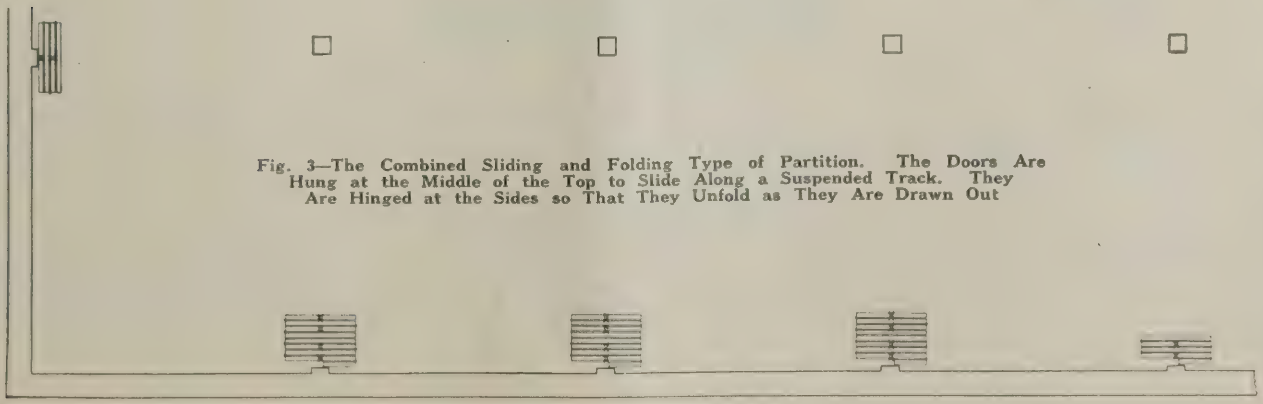


Fig. 3—The Combined Sliding and Folding Type of Partition. The Doors Are Hung at the Middle of the Top to Slide Along a Suspended Track. They Are Hinged at the Sides so That They Unfold as They Are Drawn Out

side only, add the amount given in column *H* to the entire width of opening and divide by the number of doors. This will give the width of the doors which do not adjoin the jamb. Subtract the figure in column 9 from the width of the other doors, and this will give the width of the door adjoining the jamb. When doors fold in both directions use the figures in column *J* instead of *H*.

Weights given refer to weight of each door. If doors weigh more than the figures given in the line of table opposite thickness of doors, use hangers in line corresponding with weight of door.

TABLE II.

Data Applying to Accordion Partition Doors

Hanger No.	Thickness of doors.	Size of butts.	Distance from center of hinge pin to edge of door "A."		Distance from edge of half door to center line of hanger track "B."		Space between doors when folded "C."		"E" distance from top of Soffit to bottom of header.		"F" distance from top of door to top of Soffit.	"G" distance from top of jamb to bottom of furring strip.
	ins.	ins. ins.	Loose pin butts. ins.	Tight pin butts. ins.	Loose pin butts. ins.	Tight pin butts. ins.	Loose pin butts. ins.	Tight pin buuts ins.	ins.	Soffit. ins.	Soffit. ins.	ins.
135-0	1⅜	3 x 3	¼	¼	15/16	15/16	½	½	3⅛	1⅛	1⅜	3¼
135-01	1¾	3½ x 3½	¼	⅛	1⅛	1	½	¼	3⅞	1⅛	1⅜	3¼
135-1	2	4 x 4	¼	¼	1¼	1¼	½	½	3⅞	1⅛	1⅜	3¼
135-1	2¼	4 x 4	¼	⅛	1⅜	1¼	½	¼	3⅞	1⅛	1⅜	3¼
135-2	2½	5 x 5	⅜	⅜	1⅝	1⅝	¾	¾	5¼	1⅛	1⅜	4¾
335	1⅜	3 x 3	¼	¼	15/16	15/16	½	½	3⅞	1⅛	1⅜	3¼
335	1¾	3½ x 3½	¼	1/16	1⅛	15/16	½	⅛	3⅞	1⅛	1⅜	3¼
137-0	1⅜	3 x 3	¼	¼	15/16	15/16	½	½	3⅛	1⅛	1⅜	3¼
137-1	1¾	3½ x 3½	¼	¼	1⅛	1⅛	½	½	3⅞	1⅛	1⅜	3¼
137-2	2	4 x 4	¼	⅛	1¼	1⅛	½	¼	3⅞	1⅛	1⅜	3¼
137-2	2¼	4 x 4	¼	1/16	1⅜	1 3/16	½	⅛	3⅞	1⅛	1⅜	3¼

A vertical cross section through hanger and track is shown in Fig. 3.

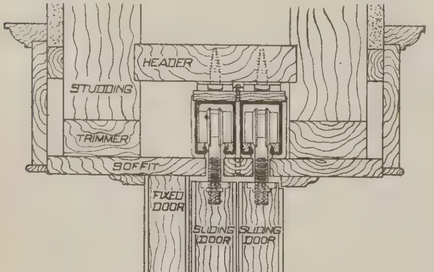


Fig. 8—Vertical Section at Top of Sliding Doors

A Sunday school room in which two whole sides are divided into separate classrooms of varying sizes is shown in Fig. 4. The dividing partition doors between the rooms are of the well-known accordion type of doors. Four full width and one-half door are required for each partition. Hangers are located on the center of two doors in each run as indicated. The doors which close the front of each room are hinged together in sections of four. Only two hangers are required for each run and these should be located as shown. The door which fills the position in front of the curved track when partition is closed, must always be a free door, that is, it must not have a hanger. This door then serves as an entrance door to the room.

The track in which the hangers run is indicated by the dotted line and is continuous, consisting of a straight section over the dividing partition between the rooms and another straight section across the front joined to the first straight section by the curved track in one corner of each room.

When the doors are all opened the entire floor is cleared, leaving one large room as shown in Fig. 5. To move the partitions the free doors in the front partitions are first swung open. The dividing partition is then folded up, after which the front partition is moved around the curved track and the unfolded. Table Fig. II. gives data relative to the size and thickness of doors, etc.

The correct width of full and half size doors should be calculated by adding the dimension *B* from the table to the width of the opening. Divide this by the number of full size doors plus ½ to obtain the width of full size doors. One-half the width of full size doors minus *B* from the table equals the width of half door.

The cross section, Fig. 3, also applies to the door shown in Figs. 4 and 5.

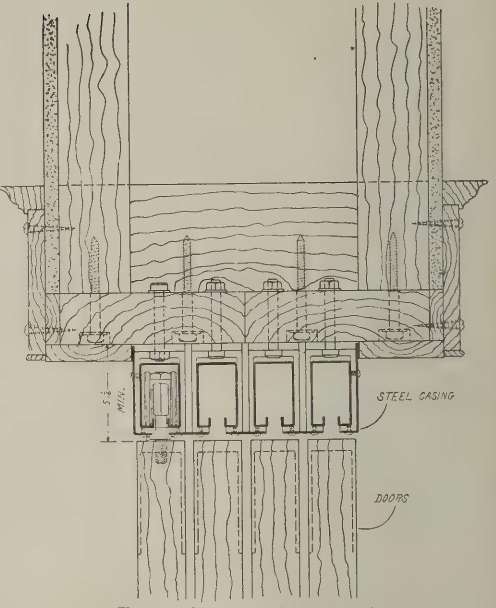


Fig. 7—Vertical Section of Sliding Doors

The series of class rooms shown in plan Fig. 6 is formed entirely by straight sliding doors. The partitions between the class rooms are composed of three doors each, one of which is stationary and the other two slide in parallel tracks as indicated by the dotted lines. The front of the three rooms is closed by a flush door partition consisting of four doors, which when open fill a position at one end of the room. The door tracks are indicated by the dot and dash lines. These rooms are in a balcony, therefore passage doors are not required in the front partitions. The first door of each dividing partition serves as a passage door between the different rooms. If it were on a main floor, wicket doors mounted with invisible hinges might be built into one of the large doors in front of each room.

Fig. 7 is a section showing hangers and track for the large doors along the front of the partition. The tracks are enclosed in steel casings. Fig. 8 is a section showing hangers and track as used for the partition doors between the class rooms. This detail shows wood casing around the tracks, but steel casing may be used if desired. Tracks of the dimensions shown will answer all ordinary requirements.

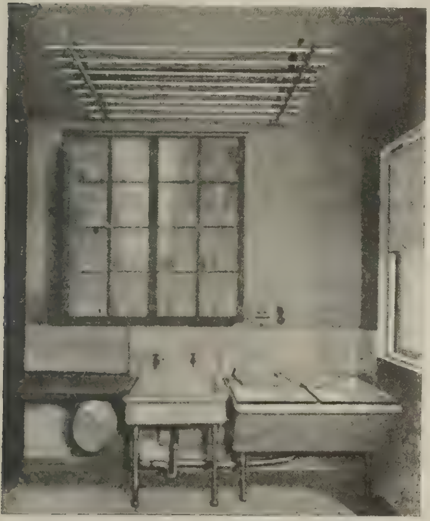
By the use of various combinations of the different styles of partitions described almost any condition likely to occur in forming Sunday school class rooms can be fully met.

Something Unusual in Equipment

New Products That Make Better Buildings or Save Time and Money on the Job

Overhead Kitchen Clothes-Dryer

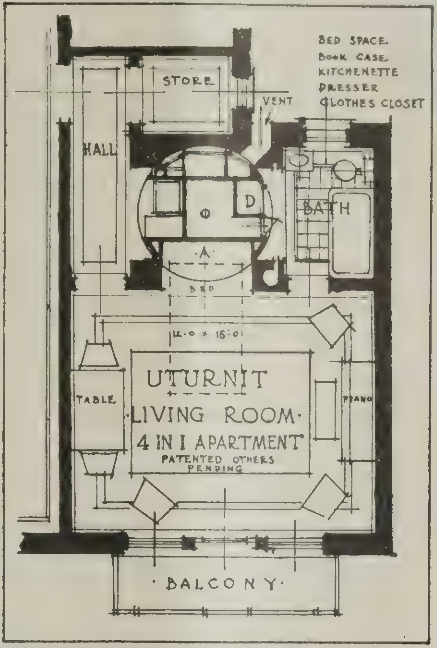
IN the modern multiple-family or apartment houses, where it has heretofore been customary for the landlords to provide pole-lines or roof-lines, recourse must be had in stormy weather to the antiquated drying facilities above described, unless an adequate indoor clothes-dryer, capable of accommodating the entire family wash is provided.



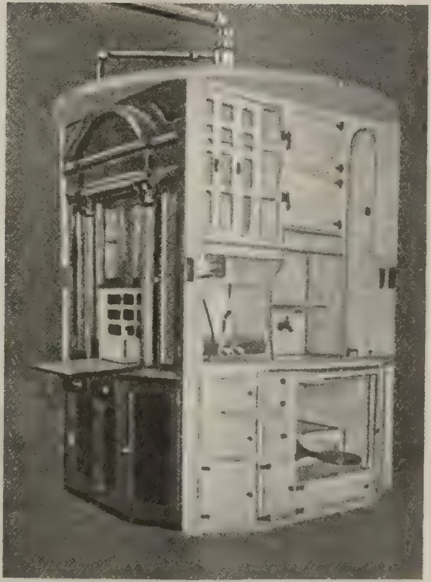
The Kitchen Clothes Drier
Raised to the ceiling for drying.

The dryer, here illustrated, consists of a neatly moulded ceiling frame from which is suspended the drying rack of eight rods, held in position by light but strong cross-members, and which can be readily lowered to any desired height for the purpose of receiving the wet clothes. The loaded dryer is easily raised to the ceiling position, rising to within two or three inches of the ceiling, high enough to avoid any interference with the opening or closing of cupboard doors and securing the hottest, purest air obtainable for the rapid drying of the clothes.

This method of clothes drying has several unique advantages. The clothes being placed on the straight rods (the larger pieces such as sheets and table cloths folded square) dry without "sagging" as in line drying; and, when dry enough to iron, the rack is lowered, the clothes ironed and returned to the rack, which is again raised to ceiling position where the clothes are allowed to remain an indefinite period, to meet the varying requirements of the housewife or laundress, until thoroughly aired.



Plan Showing Use in Small Apartment.



Revolving Drum
For turning one room into four.

One Room Equals Four

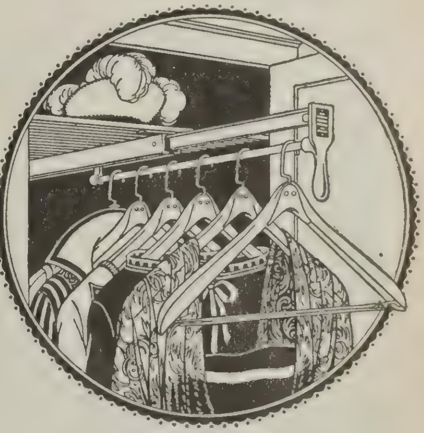
A RATHER unusual device for use in small bungalow homes or one room apartments is shown here.

A vertical revolving drum carries all the appliance of a bedroom, kitchen, living room, and dining room, and is placed in the end wall of a 1-room apartment. By turning the drum, the furniture and appliances present themselves to convert the room into any of the ordinary necessary uses.

There is a refrigerator, sink, range, etc., for the kitchen, folding bed for the bedroom, writing desk and bookcase for the living room, etc. The device serves a real purpose for cramped quarters, or small bungalows where the cost of four rooms would be prohibitive.

Extension Hangers for Shallow Closets

CLOSETS are very essential to the smooth operation of the household. And yet closets do take up space. A collapsible extension garment hanger makes it possible to get the maximum amount of garments into a shallow closet without crowding or making them inconvenient to get at. The illustration shows how these hangers are fastened to the under side of the shelves and may be pulled out through the door into the room itself for the purpose of removing or adding a garment.

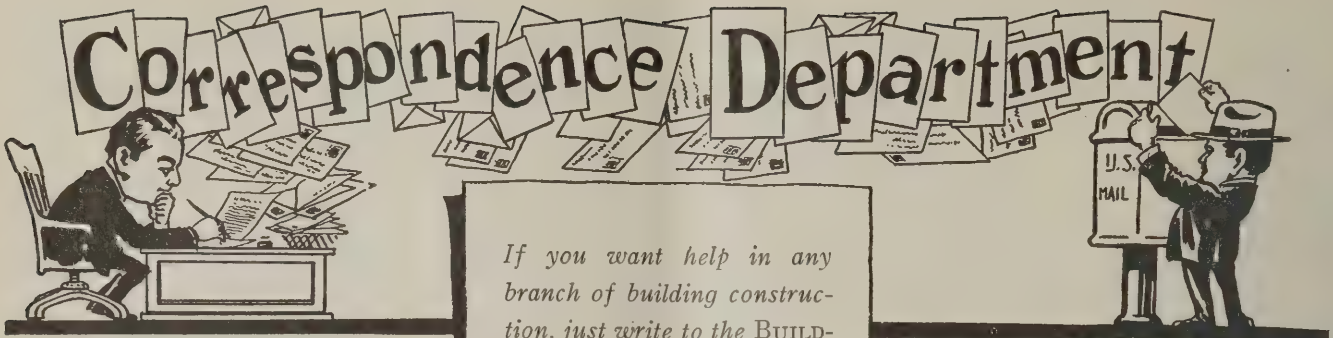


Clothes Hanger
That makes shallow clothes closets possible.

Wit such a device small closets are possible and this tends to materially increase the size of rooms. Or it is often possible to build the same size of rooms into a smaller plan and thus decrease the cost of the house.

Lot's wife looked back and was turned to a pillar of salt. Columbus looked forward and discovered America. Which way are you looking?

Inventory time will disclose many a stick of lumber which ought to be resting in the wall of somebody's home.—*Wood Construction*



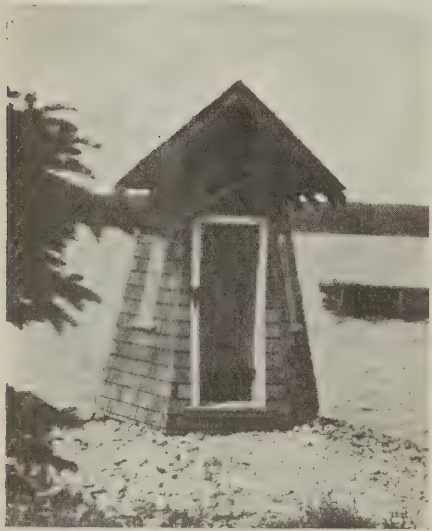
If you want help in any branch of building construction, just write to the BUILDING AGE *Correspondence Department. We will be glad to answer all your questions without charge.*

All readers are invited to discuss the questions and answers published.

A Little Suggestion for Concealing the Pump

OF course if you've a country place or a farm or even juts a summer cottage and garden of any real size, a thousand chances to one you will have to have a steam- or gasolene-pump operating somewhere about the grounds, in order to afford you a regular and abundant water-supply.

"Mechanical pumps," as they have been called, in contradistinction to the older-style pump which you and I manipulated daily in the summer-kitchen in childhood, are not wholly unmixed blessings. They mar a landscape; jar on the eye.



Novel Pump House

Against this, and also for convenience when one must "tend pump" in rainy or snowy weather, and to protect the machinery of such pumps from the elements, simple pump-houses are frequently erected, of course.

One doesn't want to spend much money upon these, and one does like to have them harmonize with surroundings otherwise here.

Hence the suggestion of the accompanying photograph for your pump-house.

It shows a really artistic, inexpensive replica of an old Dutch windmill—the building leading up to the support for sail-beam rather smaller than those of the real Dutch mills—erected at slight expenditure of either money or time, by the proprietor of a cottage at Lakeside, in The Snows, as shelter and, at the same time, camouflage for his pump.

FELIX J. KOCH,
Cincinnati, Ohio.

A Fern Box Made of Standard Moulding

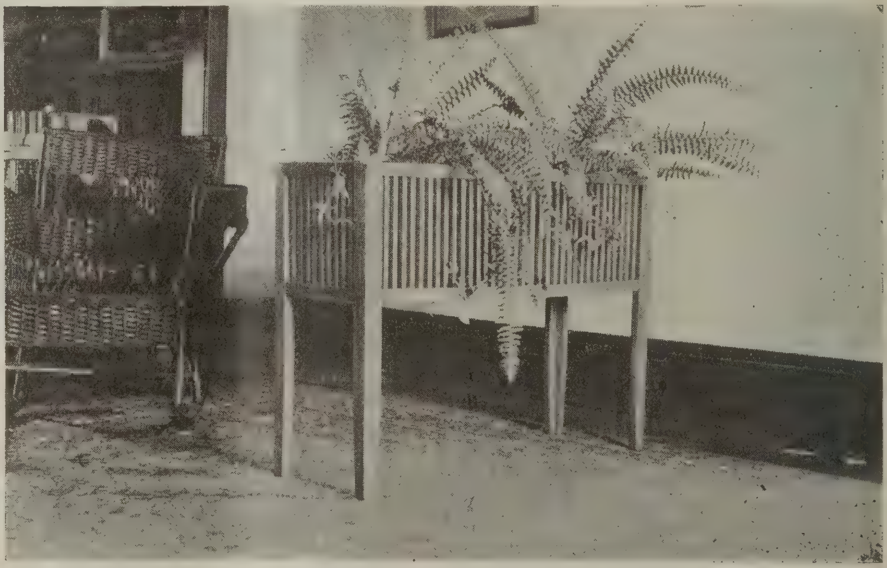
NOTHING beautifies a living room as much as growing plants, especially wide-spreading ferns. Dismayed at the high prices asked for even very inferior fern boxes in the furniture stores, I looked about for suitable material for making one myself.

The one illustrated was made of standard oak molding except for the legs. These are of oak boards 1 and 2 inches wide and a full inch thick, screwed and glued together in the form of a right angle triangle or "L." The box is 39 inches long, 12½ inches wide, and 29 inches high, outside. The box part is 11 inches high. Finding the molding in a sash and fixture company's stock, it was only necessary to adapt it to some pleasing design.

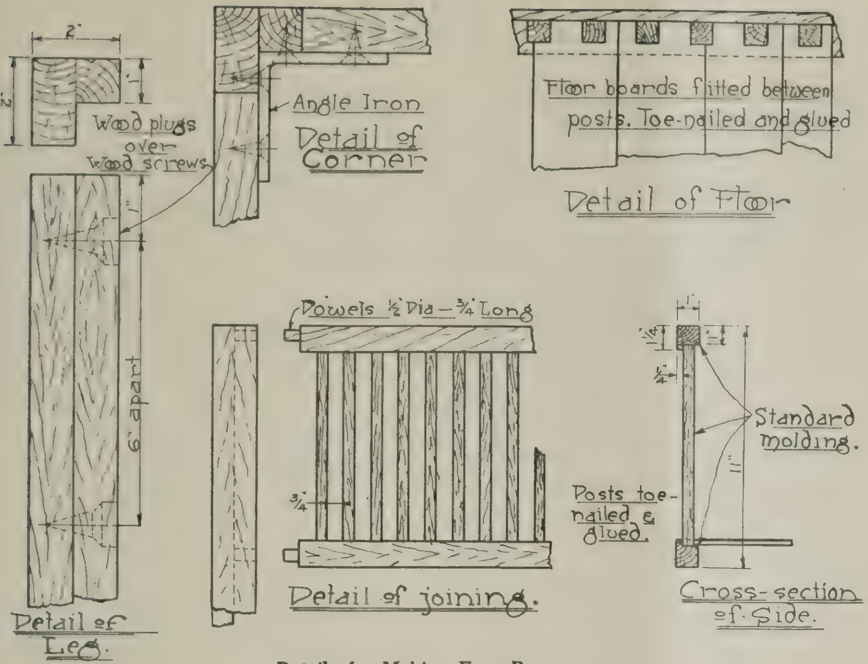
Any other standard molding might be used, provided it has enough strength and will make up into a good-looking box. No arduous labor is required, for the material is all finished for use, and no extensive cutting is necessary. All the tools needed are a plane, a drill or brace and bit, a hammer and a saw. The bill of material for this box follows:

Legs:
- 4 pieces 29 inches long, 2 inches wide, 1 inch (full) thick;
- 4 pieces 29 inches long, 1 inch wide, 1 inch (full) thick.

Side Rails:
- 4 pieces 36½ inches long. Standard molding.



How the Fern Box Looks in Real Life



Details for Making Fern Box

End Rails:
4 pieces 10 inches long. Standard molding.
Posts:
108 pieces 9½ inches long, one-half inch square. Standard molding.
Floor:
Pine boards ¼ inch thick, from packing boxes.
Hardware:
8 angle irons, 3½ in. x 3½ in. x 1 in. x ⅛ in. thick. Drilled and countersunk for wood screws; two holes in each leg of the angle.
Incidentals:
Screws, finishing nails, glue, sandpaper, stain, filler and floor wax.

When ordering the lumber something should be added to the length given to allow for cutting and fitting.

The photograph and detail sketches show the construction. When the joining was finished a coat of golden oak stain and filler was applied, followed by two coats of floor wax well rubbed in. The galvanized iron box which fits inside to hold the soil was made by a tinner.

Filling the box deserves care. The bottom should be covered with stones, coke, or porous cinders; the bottom layer about egg size—carefully set in place, filled nicely level with smaller pieces, with no large spaces between the stones. This forms a drain and a reservoir.

Leaves, or pieces of sod upside down, should now be laid over the stone so that no soil can be washed down into the reservoir. Then the box should be filled with light, rich soil. Only finely divided, well rotted manure is suitable, and it should be thorough mixed with the soil by shoveling back and forth on a concrete floor. The ferns can be planted twenty-four hours after the soil in the box has been settled by drenching with water.

A. A. ARTHUR,
Waterloo, Iowa.

HAVE you ever used any machinery or device which has saved you time and money? Have you ever invented any way of doing a piece of work quicker?

If you have BUILDING AGE wants your experience, and will pay regular space rate for it.

Your description should tell just how you saved time and money, either by a special way of using machinery or by short cuts in construction. Point out what methods you were using before adopting your "Time Saver" and show how your new method turns the trick. You can submit as many articles as you want.

Address The Editor, BUILDING AGE, 920 Broadway, New York City.

Dust Box Under Floor

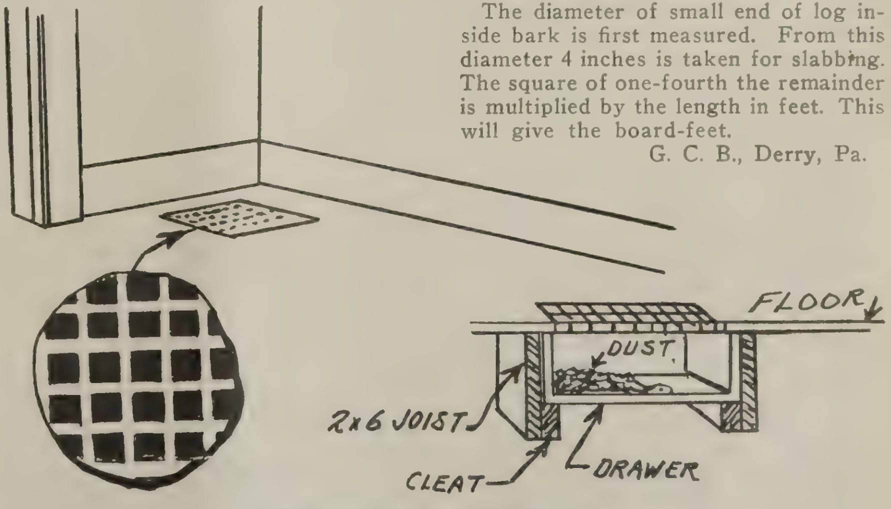
THE housewife, as a rule, sweeps kitchen two or three times a day. There is usually a reason for sweeping after the meals and sometimes on other occasions, and the task, when multiplied throughout the years, amounts to a lot of effort. By installing a meshed opening in the floor in one corner of the room, and placing a small box underneath it, within reach from the basement, the dust may be easily swept into this corner and disposed of through the squares—and into the box. Then at convenient intervals the box may be dumped of its load.

If the device is to be installed in a new house, simply specify the meshed opening with the box underneath and the carpenters will do the rest. If it is to be installed in the home already built it will be necessary to cut the opening, say twelve inches wide and sixteen inches long, and with the proper supports beneath, insert a section of hardwood mesh such as is used for cold aid drafts for the furnace. By cutting the piece slightly oversize and smoothing off the sides of the hole, a good fit may be secured.

Underneath this opening, which is made between two of the floor joists, nail two cleats to the inside of the two joists on each side. These should be about twenty inches long.

When a box is made to fit in place with a knob or handle on one end for removing, the box will be complete.

DALE R. VAN HORN,
Lincoln, Neb.



Novel Dust Box That Is Convenient

Number Board Feet in Logs

If T. C. H., Venedocier, Ohio, will use Doyle's Connecticut River Rule or better known in some places as Scribner's Rule, he will get an accurate idea of the number of board feet in saw logs.

The diameter of small end of log inside bark is first measured. From this diameter 4 inches is taken for slabbing. The square of one-fourth the remainder is multiplied by the length in feet. This will give the board-feet.

G. C. B., Derry, Pa.

What the Editor Thinks

The Future of Building

WARE reductions, overcompetition among building contractors and material supply interests and a growing condition of reserve stock shrinkage at mill centers leave an uncertainty in the mind of the procrastinating building investor.

Building material dealers are rushing into overcompetition practices that are bound, sooner or later, if continued, to bring about a reaction that will be different from that which the late comer into the building construction market now hopes to bring about. It is possible that this turn will come in the form of certain mergers of existing factors that, in effect, may easily tend to nullify some of the results the Lockwood investigation sought to accomplish in the matter of speedily restoring building material price levels to pre-war planes.

Certain truths stand out clearly. Arbitrary cost standards fixed by prospective builders cannot be realized this year with particular reference to wage scales operative in New York. Further price reductions in basic building materials cannot be sufficient to merit the risk involved in waiting for pre-war levels. Freight rate reductions in building materials, even if granted this year, probably will not be sufficiently extensive to merit the risk involved in waiting for pre-war levels. A sudden turn in demand might wipe out in a week all the benefit freight rate reductions might bring about in the building industry.

Grouping Houses To Get Ideal Homes

ONE of the most interesting developments in recent years is the demand for apartment houses in the smaller towns, structures that may be built for around $30,000 and which house from six to ten families.

There are many advantages which the apartment house has over the private dwelling, as those who have lived in both are quick to realize. Care of grounds, furnace, servants, etc., are a very real drawback to the ownership of a home, whereas the small apartment does away with these disadvantages. Yet the greater amount of fresh air and light in every room more than places the balance in favor of the private dwelling. It is significant that the word "home" is seldom applied to an apartment in the same sense that it is to a detached house.

In certain sections of the country there is a strong tendency to supply maid service in apartment houses, and to have a central kitchen where meals are cooked and served in the apartments. Life in such an apartment is ideally comfortable, for cleaning, heating, eating and everything else is taken care of. There are no "chores."

There is absolutely no reason why the small private dwelling should not have all these advantages as well as the apartment. More and more is the court or group idea for small houses gaining in favor. There is every reason why it should, although its possibilities have not been developed to the fullest extent.

In grouping houses in a court, the grounds can be laid out in park-like fashion, with a central playground for the children. Because of the beautiful surroundings, each house will look far better in the group than it would alone and, if handled right architecturally, each house will lend just a little bit of its own beauty to its neighbors. Furthermore, there are very real advantages in the construction of such houses, for they can have like plans with varying exteriors, and so be easier and cheaper to construct. Quantity buying can be done and full advantage taken of the economies always possible when work is routed in a wholesale way.

But that is only part of the story. A group of factory buildings will have a central heating plant. Why should not the house court have one? Why should it not have common maid service, so that every week each home could be thoroughly cleaned, perhaps with a vacuum cleaner? Why should there not be a community kitchen kept unvaryingly cool by electric fans? Why should not married couples be able to leave their children with a maid when they desired to take an afternoon's or evening's pleasure?

In short, why should we not have bungalow or house courts where a family can buy not only a home, but comfort and service as well? Where all the unliked details of grass cutting, house cleaning, snow shoveling, etc., should be taken off one's hands and placed in the hands of specialists? Why not?

There is a tendency towards this Utopia. Some day, somewhere, a builder with vision is going to sell people more than a small home—he will take the logical step forward and sell a home life worth living. And that man will reap the rewards always secured by those who sell a real, needed service.

A Source of Information Worth Cultivating

THE average salesman who calls on a builder is frequently regarded as a nuisance. Sometimes he is, but if rightly used, he can be made one of the most valuable sources of information at the disposal of any contractor.

Have you ever stopped to think that these men do nothing else but travel around talking to builders and architects? That as a class they are wide-awake, observing men who come in contact with countless good ideas that they are ready to pass on to those who draw them out? That ten minutes' talk with one of these men may well give an idea about construction methods or equipment that will be worth hundreds, even thousands of dollars to the contractor lucky enough to take the time to learn.

Try cultivating these men for a month or two. Regard them as sources of information which are mighty valuable if rightly used. With the man who is selling equipment, ask him what other builders use and what results they are getting. Ask his advice on routing equipment so as to keep it always busy. Let him tell you all about his product and draw him out on other lines on which he may contribute ideas of value. See if he knows of business building methods used by other contractors. Tell him you are always glad to see any salesman who can come and teach you something or give you an idea worth having.

Ideas are priceless. The traveling salesman is generally one of the very best sources of information if given half a chance. Among salesmen, it is an established fact that the bigger the man, the easier he is to talk with, for the really big man is always anxious for, and ready to receive information. He knows through experience the value of the ideas that the salesman may be able to give.

If the big men feel this way about the traveling salesmen, and they certainly do, then no builder however small can afford to overlook one of the same sources of information that have helped to make the big men bigger.

Why Is a Freight Rate?

WE have talked a whole lot about the high cost of freight and have even said that the cost of transporting building materials by rail was one of the factors that is barring the onward progress of building and construction. We mean that railroads must reduce their rates to encourage adequate building.

Manufacturers have reduced the cost of their products at the mill; labor has accepted cuts in various localities and is preparing to accept them in others—perhaps after a fight—but, nevertheless, accept them. All of these factors have made themselves felt in reduced cost of materials and building operations.

But what about freight? Railroads have reduced their labor costs to a point where these costs are now less by several hundred million than they were last year. But they still hang on to the old rate.

The expense of building operations can and must be materially reduced by reducing materially the cost of handling material by rail. For example, certain grades of face brick are today selling at the plant for $30 a thousand. To bring them to the job costs $18 more, or 60 per cent. of what it costs to manufacture and sell them. It sounds foolish but it is true. Another grade of brick costs $35.50 at the plant. To deliver this brick on the job the builder must pay $60.50, or nearly double the cost of the brick.

The same condition applies to other materials in the building industry. The time has come for an equitable revision of rates so that they will not put such a heavy burden on the builder, and on the building public.

Review Building Situation

CONSTRUCTION activity in June, according to figures published by the F. W. Dodge Company, was 6 per cent. less than in May, although it was greater than in April. Contracts awarded during June in the twenty-seven Northeastern States of the country amounted to $227,711,000.

Those sections in which labor troubles have been most pronounced were the ones in which decreased building activity was evident. Furthermore, the latter half of June showed up more strongly than the first half. The two facts seem to indicate that the small decline in June was only a temporary setback.

Included in the June total were the following items: $75,175,000, or 33 per cent., for residential buildings; $52,967,000, or 23 per cent., for public works and utilities; $25,493,000, or 11 per cent., for business buildings; $23,441,000, or 10 per cent., for educational buildings; and $18,502,000, or 8 per cent., for industrial plants.

The first half of this year has shown up quite favorably in comparison with previous years. From January 1 to July 1, the total amount of contracts awarded has been $1,066,256,000. This figure is 9½ per cent. greater than the average semi-annual total for the preceding five years.

Included in the total for the first six months of 1921 were the following items: $360,828,000, or 34 per cent., for residential buildings; $242,701,000, or 23 per cent., for public works and utilities; $144,488,000, or 13½ per cent., for business buildings; $104,194,000, or 10 per cent., for educational buildings; and $86,940,000, or 8 per cent., for industrial buildings.

Contemplated new work has been reported during the first six months of this year to the amount of two and a half billion dollars.

June was a month of price and wage adjustments. Pending these adjustments the public has maintained an attitude of hesitation about going ahead. There are certain advantages in building now, especially in those localities where wages have been substantially reduced.

A stronger feeling of confidence is the principal element needed to encourage increased activity in the remaining summer months. While there is in evidence a tendency to hold up building operations till the fall, there is a good chance that July will be a month of somewhat greater activity than June.

In 1919 60 per cent. of the year's total construction activity occurred in the second half of the year. Thus far this year's activity has kept somewhat ahead of 1919. If it continues to do so, the remainder of this year should show 50 per cent. more activity than the first half has shown. This is very likely to happen.

CONTRACTS AWARDED

	CLASS OF BUILDING						
Section of Country	Residential	Industrial	Business	Public Works and Utilities	Educational	Other	Total
New England	$7,004,200	$ 940,100	$2,568,700	$2,518,600	$1,743,000	$1,436,000	$16,210,600
New York Dist.	33,882,000	2,909,500	7,875,900	5,894,600	3,936,800	8,160,600	62,659,400
Middle Atlantic	7,112,000	2,078,700	3,932,800	10,276,500	4,147,100	4,588,800	32,135,900
Pittsburg Dist.	9,640,000	9,935,800	3,083,400	13,833,900	3,762,300	6,772,800	47,224,700
Middle West	15,377,900	2,461,000	7,519,600	17,132,300	9,066,800	9,470,600	61,028,200
Northwest	2,158,700	177,000	512,800	3,311,100	785,200	1,507,300	8,452,100
Total	$75,174,800	$18,502,100	$25,493,200	$52,967,000	$23,441,200	$32,132,600	$227,710,900

CONTEMPLATED PROJECTS

	CLASS OF BUILDING						
Section of Country	Residential	Industrial	Business	Public Works and Utilities	Educational	Other	Total
New England	$7,953,000	$2,141,000	$3,187,500	$2,244,100	$1,725,200	$2,046,900	$19,298,500
New York Dist.	54,651,900	3,235,000	12,349,700	6,020,500	6,795,200	9,637,600	92,689,900
Middle Atlantic	15,639,900	5,769,700	8,546,900	18,783,000	14,138,900	6,113,600	68,992,000
Pittsburg Dist.	14,744,700	5,048,500	8,460,800	9,578,900	8,513,100	6,153,200	52,499,200
Middle West	26,214,700	8,538,000	16,946,600	27,166,500	11,041,300	13,612,400	103,519,500
Northwest	3,387,200	166,000	757,300	5,005,600	4,098,000	2,038,300	16,252,400
Total	122,592,200	$24,898,200	$50,248,800	$68,798,600	$46,311,700	$40,402,000	$353,251,500

Trend of Material Prices

THE following are wholesale prices of basic building materials in the three markets which set prices for the rest of the country.

These prices are presented to show the trend of the wholesale market, which forecasts prices in the retail market. They are not prices which the average contractor can buy at, but are quoted to show him the movement of materials so that he can buy to better advantage.

Followed in conjunction with the Review of Building Conditions, these prices will prove invaluable.

All prices are for carload lots, F. O. B. market quoted, unless otherwise noted.

NEW YORK PRICES

	August 23	July 23
LONG LEAF YELLOW PINE		
B. and Better Flat Grain Flooring, 2½″ Face	$54.00	$54.50
Dimension, S1S1E, No. 1 Common, 2x4″, 10′	38.00	38.00
Timbers, Merchantable, '05, 12x12″, 10 to 20′	47.00	45.00
B. and Better Ceiling, ½x3¼	36.00	36.00
B. and Better Finish, 1x4″	51.00	51.00
No. 1 Common Boards, 1x8″	40.00	40.00
NORTH CAROLINA PINE—		
No. 2 and Better Flooring, 13/16x2½″	$55.00	$55.00
Roofers, 13/16x5½″	29.00	29.00
DOUGLAS FIR—		
No. 2 Clear and Better V. G. Flooring, 1x3″	$75.50	$75.50
No. 1 Clear V. G. Flooring, 1x4″	.....	74.00
No. 2 Clear and Better Ceiling, ⅝x4″	35.00	35.00
No. 2 Clear and Better Novelty Siding, 1x6″	42.25	42.25
No. 2 Clear and Better V. G. Stepping	87.00	87.00
Dimension, S1S1E, 2x4″, 16′	40.00	40.00
Timbers, S1S1E, 12x12″, 16′	50.00	50.00
WESTERN RED CEDAR—		
B. C. Perfection Shingles, per M	$7.30	$7.45
Washington Perfection Shingles, per M	6.90	7.15
Clear Bevel Siding, 1½x6″	45.00	45.00
CANADIAN SPRUCE—		
No. 1 Lath, 1½″	$8.50	$8.00
Dimension, 2x4″, 10 to 16′	47.00	47.00
HARDWOOD FLOORING—		
Clear Quartered White Oak, 13/16x2x2¼″	$148.75	$147.50
Clear Plain White Oak	108.75	107.50
Clear Maple, 13/16x2¼″	97.50	95.00
Clear Quartered White Oak Parquetry Strips, 5/16x2″	143.50	142.00
Clear Plain White Oak Parquetry Strips	99.00	98.00
(All lumber prices furnished by LUMBER)		
COMMON BRICK—		
Per M. f. o. b. job	$18.40	$18.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers, f. o. b. dock	2.40	2.40
STRUCTURAL STEEL (IRON AGE)—		
Cents per lb. to large buyers	2.38	2.38
CRUSHED STONE (cu. yd.)—		
¾ in.	$3.00	......
1½ in.	2.90	......
WALL BOARD—		
Per 1,000 sq. ft. in lots under 1,000 sq. ft.	$52.50	......
Per 1,000 sq. ft. in lots 1,000 to 2,500 sq. ft.	47.50	......
METAL LATH—		
2.3 lb.—warehouse price per 100 sq. yd.	$22.64	$25.00
2.8 lb.—warehouse price per 100 sq. yd.	26.60	27.00
3.4 lb.—warehouse price per 100 sq. yd.	29.33	29.00
Add 5 cents per sq. yd. for galvanized.		
LIME (Hydrate)—		
Finishing, per ton	$26.00	$26.00
Masons, per ton	20.50	22.00
SAND AND GRAVEL (cu. yd.)—		
Sand	$1.80	......
¾ in. gravel	3.40	......
1½ gravel	3.40	......

CHICAGO PRICES

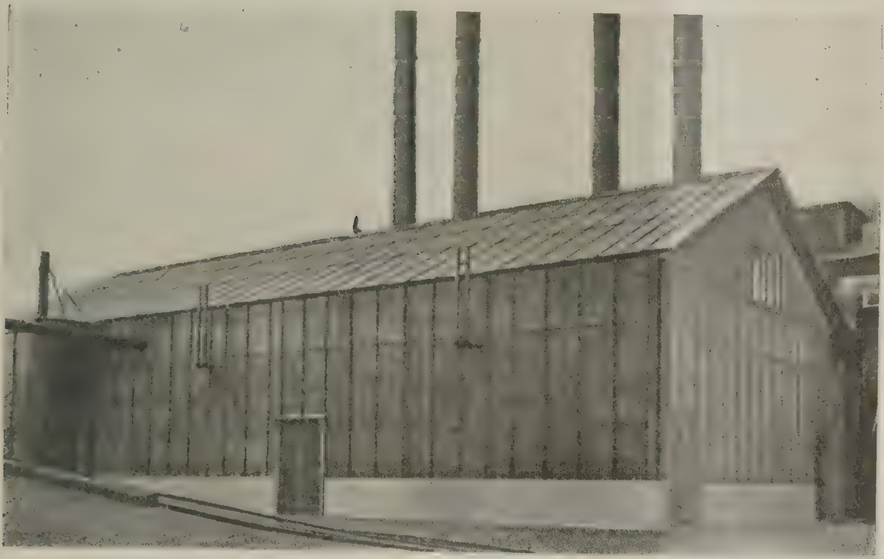
YELLOW PINE—		
Boards, 1x8, No. 1 Com	$32.00	$33.00
Casing and Base, 4-6 in.	55.00	55.00
Ceiling, ⅝x4, B. and Btr	36.00	36.00
Dimension No. 1, 2x4, 12 to 14 ft	31.00	31.00
Drop Siding, 1x6, B. and Btr	38.00	38.00
Finish, 1x4, B. and Btr	50.00	50.00
Flooring, B. and Btr. E. G., 1x3	68.00	68.00
Flooring, B. and Btr. F. G., 1x3	42.00	42.00
Lath, 4 ft., No. 1	5.60	5.90
Timbers, Long Leaf No. 1, 10-20 ft., S4S, 6x12 to 12x12	39.00	40.00
NORTHERN HEMLOCK—		
Boards, No. 1, 8 to 16 ft., 1x6 to 8 in.	$31.00	$33.00
Lath, 4 ft., No. 1	9.25	9.00
DOUGLAS FIR—		
Boards, No. 1, S2S, ¾ in., 1x8 to 10 in.	$28.75	$30.75
Dimension, No. 1, S1S1E, 8 ft., 12 ft., 14 ft., 2x4 in.	29.00	30.00
Drop Siding, 1x6 Pat. 106, No. 2, C. and Btr	35.50	35.50
Flooring V. G., 1x4, No. 1	65.50	68.50
Lath, 4 ft., No. 1	7.40	7.25
Timbers, No. 1 Com., 12x12 in. and under, 40 in. and under, rough	36.00	36.00
HARDWOODS—		
Maple Flooring, 13/16x2¼, clear	$94.75	$95.00
Oak Flooring, 13/16x2½, Cl. Pl., White	98.00	105.00
REDWOOD—		
Bevel Siding, S1S1E, 10 ft., 20 ft., ½x4, clear	$38.25	$38.25
Finish, S2S or S4S, 1x6 to 8 in.	91.50	91.50
WESTERN RED CEDAR—		
Bevel Siding, ½x4 in., Clear	$42.00	$42.00
Shingles, Extra Clears, 16 in.	4.26	4.26
COMMON BRICK—		
Per M. f. o. b. job	$12.00	$12.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers	$2.47	$2.17
STRUCTURAL STEEL—		
Cents per lb. to large buyers	2.38	2.38
CRUSHED STONE (cu. yd.)—		
¾ in.	$2.25	......
1½ in.	2.10	......
WALL BOARD—		
Per 1,000 sq. ft. in lots under M	$57.50	......
Per 1,000 sq. ft. in lots 1 M to 2½ M	52.50	......
SAND AND GRAVEL (cu. yd.)—		
Sand	$2.25	......
¾ in. gravel	2.25	......
1½ in. gravel	2.25	......

ST. LOUIS PRICES

YELLOW PINE—		
Boards, B. and Btr., E. G., 1x3	$66.00	$66.00
Ceiling, ¾x3¼, B. and Btr	39.50	41.00
Dimension, No. 1, S1S1E, Short Leaf, 2x4 in., 12 & 14 ft.	28.50	29.50
Finish, S2S, B. and Btr., 1x4	47.00	47.00
Flooring, B. and Btr., E. G., 1x3	66.00	66.00
Flooring, B. and Btr., F G., 1x3	40.00	40.00
Lath, 4 ft., No. 1	5.50	5.25
Timbers, No. 1, rough, short leaf, 6x12 to 12x12 in., 10 to 20 ft	36.00	39.00
DOUGLAS FIR—		
Ceiling, F. G., ⅝x4 in., No. 2, Cl and Btr	$29.50	$29.50
Dimension, No. 1, S1S1E, 2x4 in., 8, 12, 14 ft.	30.00	30.00
Drop Siding and Rustic, 1x6 in., No. 2, Cl and Btr	37.00	37.00
Finish, F G., S2S or S4S, 1x4 in, No. 2 Cl. and Btr	61.25	61.25
Flooring, 1x4 in., No. 1, Cl., V.G.	65.50	65.50
Stepping, V.G., 1¼x10 in. & 12 in., No. 2, Cl. & Btr.	77.75	77.75
CALIFORNIA REDWOOD—		
Finish, S2S, Cl., 1x6 in.	$91.50	$91.50
Siding, 4 in. Bevel, 10 to 20 ft.	38.25	38.25
8 inch Colonial	66.75	66.75
8 inch Bungalow	68.75	68.75
HARDWOODS—		
Maple Flooring, 13/16x2¼ in., Clear	$96.75	$96.75
Oak Flooring, ⅜x1 and 2 in., Clear Qtr. White	110.00	110.00
RED CEDAR—		
Siding, ½x6, Clear	$41.00	$41.00
Shingles, Clears	4.06	4.21
COMMON BRICK—		
Per M. f. o. b. job	$17.00	$12.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers	$2.50	$2.60
STRUCTURAL STEEL—		
Cents per pound to large buyers	2.475	2.475
CRUSHED STONE (cu. yd.)—		
¾ in.	$2.60	......
1½ in.	2.60	......
WALL BOARD—		
Per 1,000 sq. ft. in lots under M	$57.50	......
Per 1,000 sq. ft. in lots 1 M to 2½ M	52.50	......
SAND AND GRAVEL (cu. yd.)—		
Sand	$1.50	......
¾ in. gravel	1.50	......
1½ in. gravel	1.45	......
(Following prices are F.O.B. factory.)		
FACE BRICK—		
Harvards	$41.00	$47.00
Tapestry	30.00	32.50
Caledonian	34.00	......
Smooth Grey	35.00	35.00
Fisk Lock	35.50	37.50
Brick used with Fisk Lock	24.50	35.50
SHINGLES (per square)—		
Asphalt single	$6.40	$9.00
Asphalt strip	5.75	8.20
STAINED WOOD—		
16 in. extra clear	$9.75	$9.90
18 in. Eureka	10.50	11.50
18 in. Perfection	11.50	12.65
18 in. Royal	11.40	......
24 in. Imperial	12.00	......

Corrugated Wire Glass Roofs

How To Lay Them on Either Timber or Steel Construction



DAYLIGHT buildings mean increased production; therefore, in factories and allied types of buildings, corrugated wire glass is an important factor for consideration by builders, architects and engineers.

Owing to its peculiar properties of construction, it does not splinter and fly apart in the manner common to plain glass when attacked by fire or assailed by shocks.

Corrugated wire glass also very satisfactorily diffuses light rays and eliminates annoying shadows and glare, giving a uniform and soft-lighting effect. For these reasons it has proved highly popular under all conditions.

It has a smooth-finished surface, which makes it difficult for dust and dirt to collect. Grease, paint and other foreign substances can be easily removed.

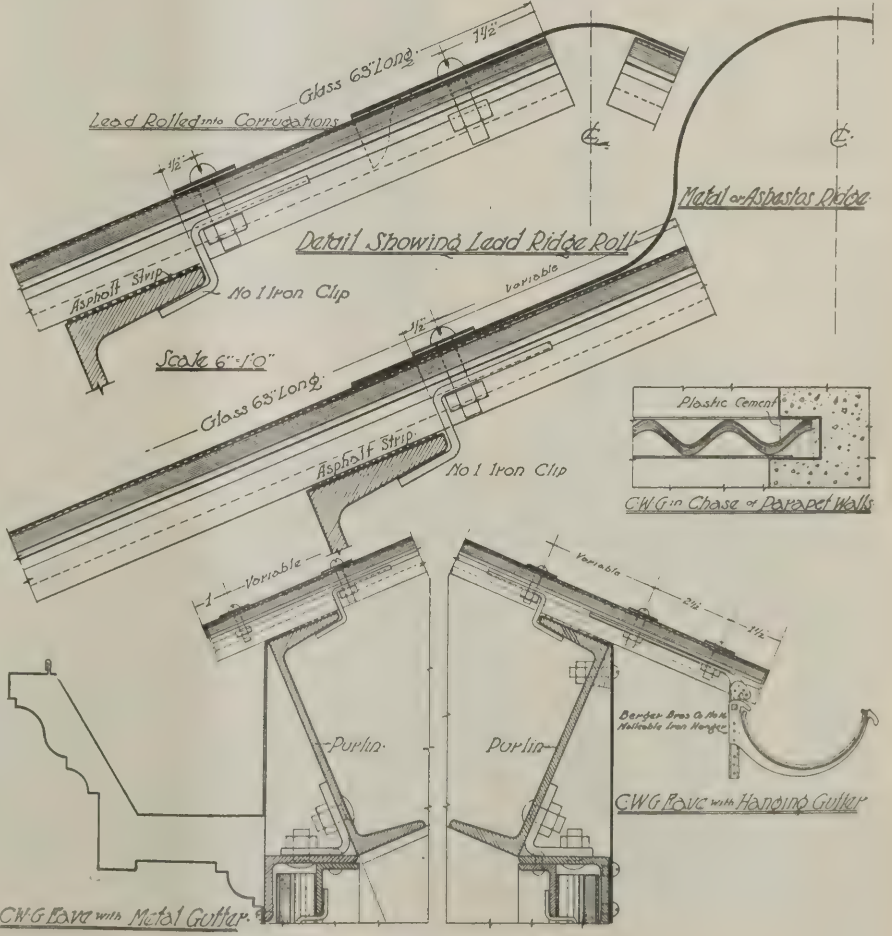
Due to the corrugations it has a strength many times greater than any other wire glass of equal thickness, and will support itself without the aid of any special roof members.

Each joint of glass is in reality an expansion joint, and gives to the roof a combination of flexibility and rigidity, as well as being water-tight. Each sheet when erected has twenty times more expansion room than is necessary with temperatures between zero and 200°, and when properly installed will not leak.

Corrugated wire glass is designed to nest not only with itself but with other corrugated materials (of equal pitch) and has the quality of being "self-washing." Ordinary rains keep the glass clean, owing to its peculiar form.

Roof purlins should be spaced 5 ft. 1 in. center to center when I-beams are used or back to back when channels are used. This allows 2 in. for lap at end joints. The glass should not be set against building metal without placing an asphalt strip between. Lay the glass edge to edge and allow a space between the sheets. Cover joints with a 2¾ in. asphalt strip, painted with asphalt varnish on the side next to the glass, the full length of the sheet. Then cover with a 2¾ in. No. 24 gage metal strip the full length of glass and underneath place a 1½ in. metal strip.

The main fasteners are to be hooked to the purlins with reinforcing clips securely fastened with ¼-inch by 1½-in. rust-proof store bolts with lead washers on top of the cover strip. Between the purlins or main fasteners put in intermediate fasten-


Glass 63" Long
1½
Lead Rolled into Corrugations
½
Asphalt Strip
No 1 Iron Clip
Detail Showing Lead Ridge Roll
Metal or Asbestos Ridge
Scale 6"-1'0"
Variable
½
Glass 63" Long
Asphalt Strip
No 1 Iron Clip
Plastic Cement
C.W.G. in Chase of Parapet Walls
Variable
Variable
2½
1½
Berger Bros Co No 16 Malleable Iron Hanger
Purlin
Purlin
C.W.G. Eave with Hanging Gutter
C.W.G. Eave with Metal Gutter

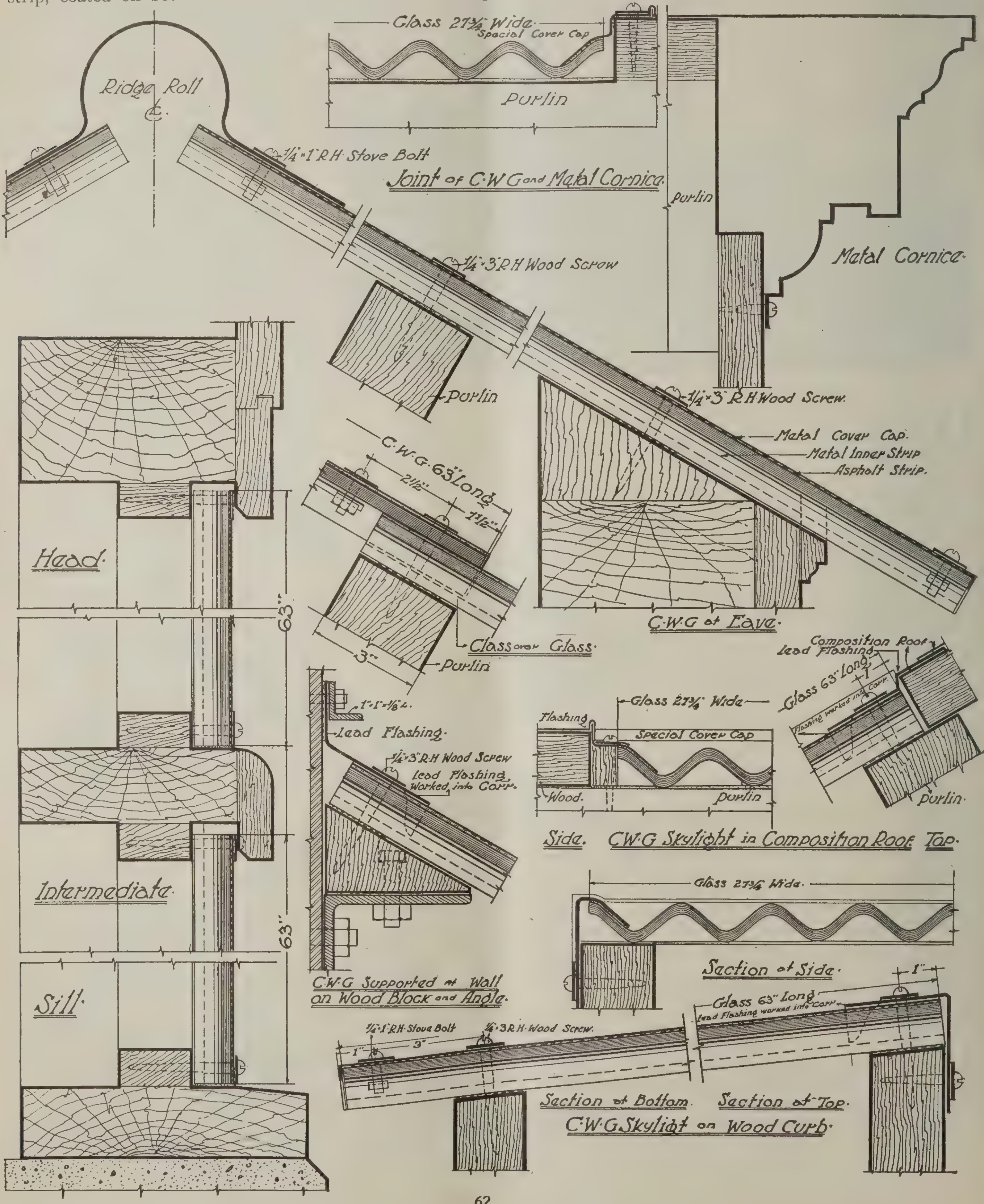
Details for Steel Construction

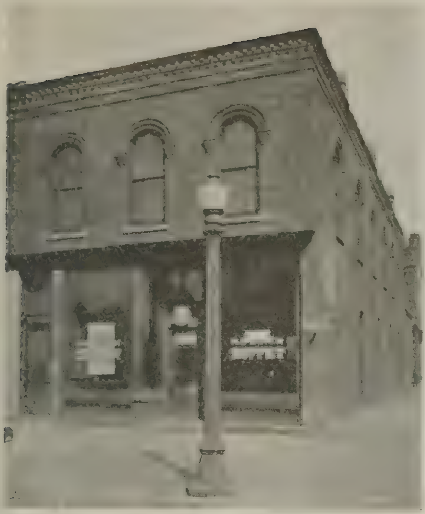
ers, not over 12 in. centers, of rust-proof ¼ in. by 1 in. stove bolts, with lead washers securely screwed down. Tighten bolts snug so as not to strain glass.

Always have laps of glass come over purlins. Lay a 2 in. asphalt strip, coated on both sides with asphalt varnish, across the glass at the top, full width pressed into corrugations of glass, and on this lay the second row of glass with lap, over lower sheets. Place asphalt strips on all purlins and wherever glass rests, to protect the plass.

Metal cover caps and inner strips, bolts, washers, clips, asphalt varnish, asphalt strips, etc., are necessary to make a water-tight and workmanlike job. Provide two coats of asphalt varnish for all metal work.

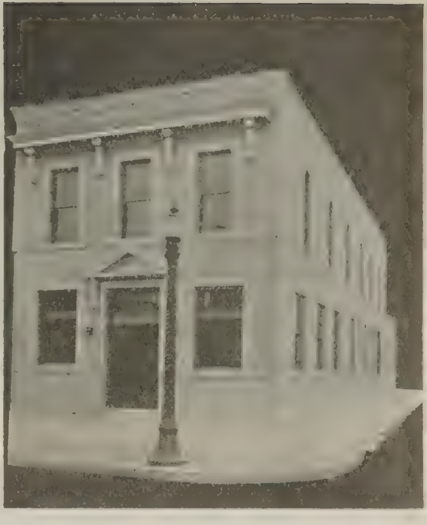
The ridge roll is securely bolted to purlins and all spaces are made water-tight by filling in with plastic cement.





Remodeling Makes Old Buildings Pay Dividends

Jobs Done by Builders Whose Ideas Have Turned Unwanted Structures Into Money Makers

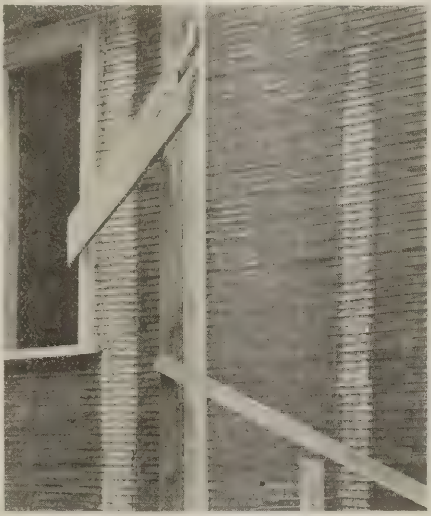


Saloon Building at Marseilles, Ill., Now Occupied by Farmers & Merchants State Bank

THE building trade workman is busy on the average about 190 days in the year, or two-thirds of his time. A few contractors, individually or associated, are attacking this problem with effective results. The public also must be educated to the needs of a sensible distribution through the year of its construction demands and requirements."

This statement appears in the report just made by the Committee of the American Engineering Council appointed by Herbert Hoover. A summary of the report appears elsewhere in this issue. It is well recognized that many alteration and remodeling jobs can be done in the winter as well as the summer, thereby providing employment for the building trades and helping to pay the always present overhead.

The report puts it right up to the builder and contractor to educate the public to this need for building in the winter, and to counteract the more or less general opinion that such work cannot be done. Any of the jobs shown here could be handled then as well as any other time of the year.

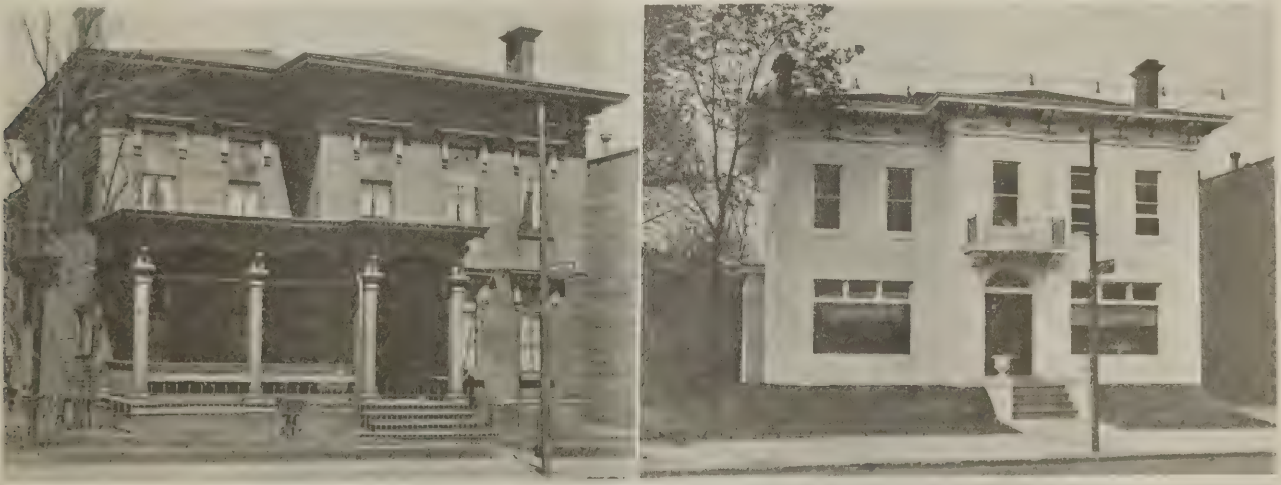


Detail—Metal lath as stucco base. See page 64.

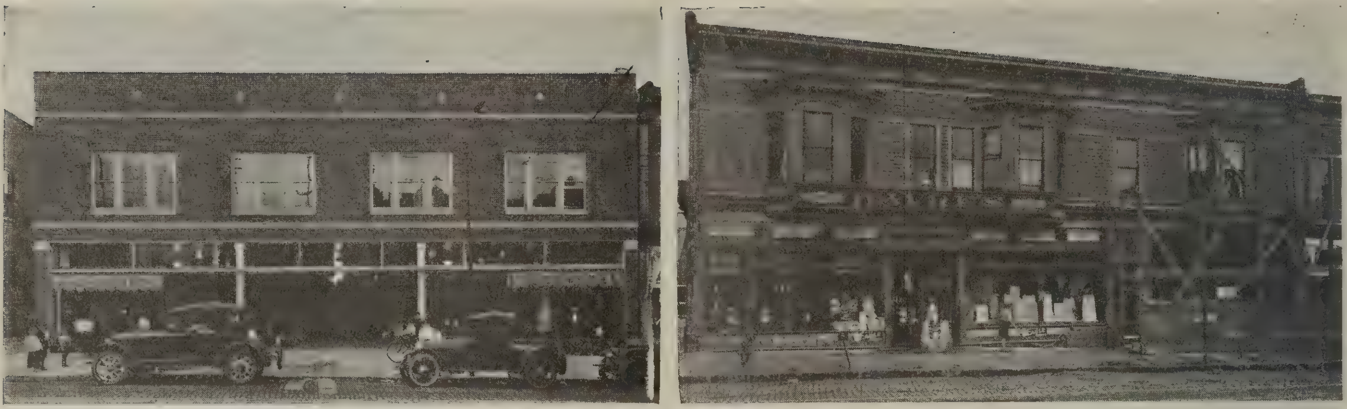
The Farmers and Merchants Bank at Marseilles, Ill., is interesting for another reason also. It shows how the Volstead Act might be a real business opportunity for the builder. The former saloon shown here presents quite a decent appearance when dressed up like a bank. The Wimmer Contracting Company who did the job deserve considerable credit for the manner in which it was handled.

Equally well handled are the store building and the offices of the George Rutherford Construction Company. This company did both of these jobs and the before and after pictures speak for themselves of the manner in which they were done.

The time to begin public education is now. Let your newspaper advertising and circulars include remodeled jobs, showing what can be done.

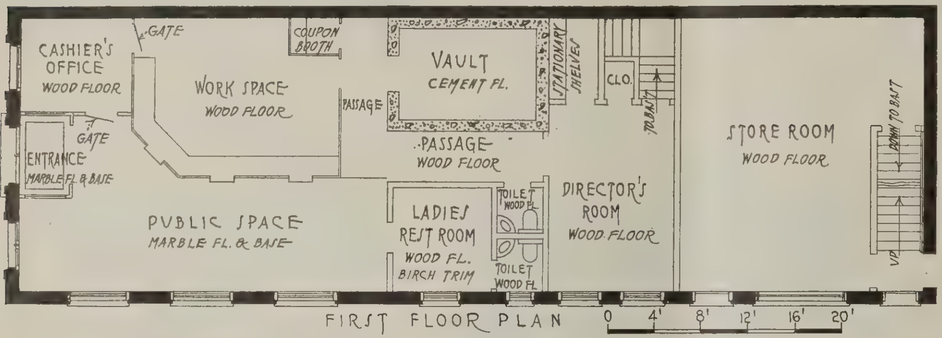


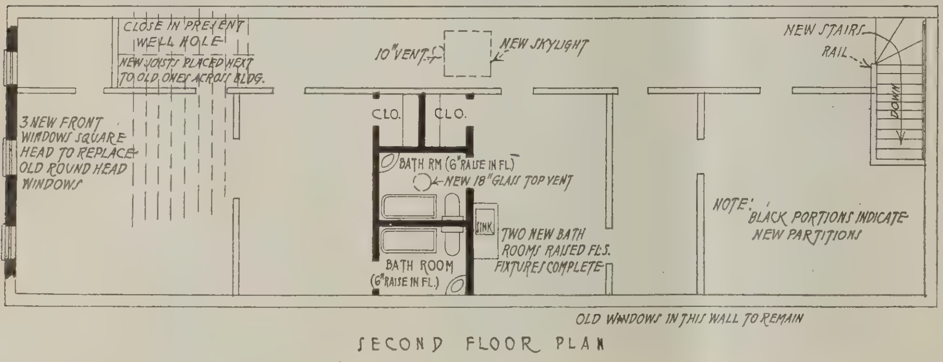
Old House Which Was Remodeled and Used as Offices by the George Rutherford Construction Co., Cleveland, Ohio

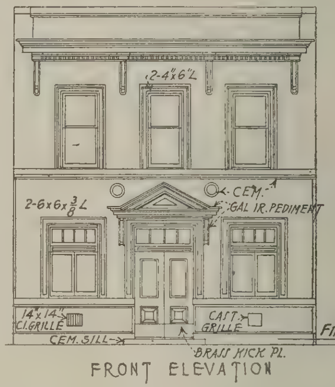


Above:

Before and after pictures of an old store with apartment above remodeled into new and up-to-date building.

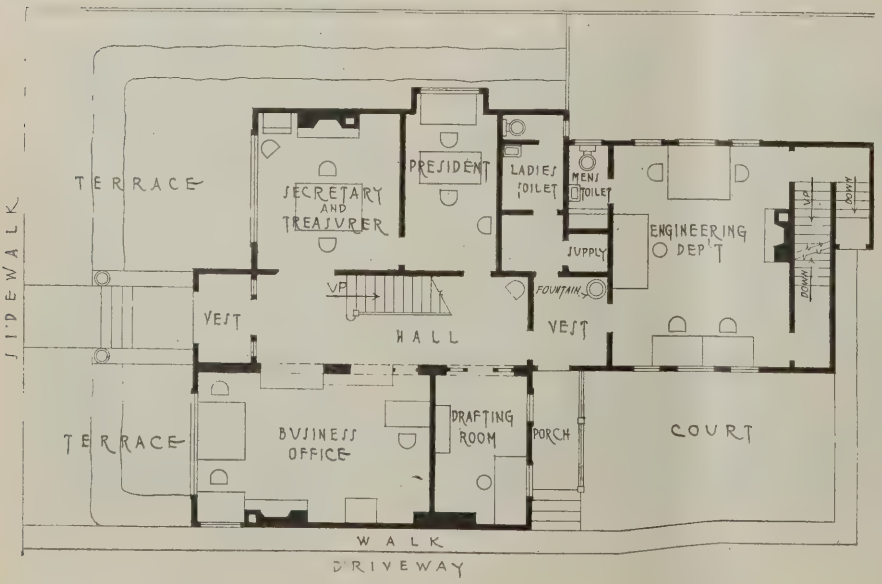



CLOSE IN PRESENT WELL HOLE
NEW JOISTS PLACED NEXT TO OLD ONES ACROSS BLDG.
10" VENT
NEW SKYLIGHT
NEW STAIRS
RAIL
DOWN
3 NEW FRONT WINDOWS SQUARE HEAD TO REPLACE OLD ROUND HEAD WINDOWS
CLO.
CLO.
BATH RM (6" RAISE IN FL.)
NEW 18" GLASS TOP VENT
SINK
TWO NEW BATH ROOMS RAISED FLS. FIXTURES COMPLETE
BATH ROOM (6" RAISE IN FL.)
NOTE: BLACK PORTIONS INDICATE NEW PARTITIONS
OLD WINDOWS IN THIS WALL TO REMAIN
SECOND FLOOR PLAN



Above:

Plans and Elevation of Farmers & Merchants State Bank, shown on Page 63



Left:

Plan of residence shown on page 63 after remodeling into offices.

Homeward Bound to a Garage equipped with NATIONAL Garage Door Sets

The Increasing Number of Automobiles means more business for the Builder.

The field of garage building is a large one for the builder and the present day demands for efficiency in construction and equipment necessitate using only the best. Protect your customer and your reputation by using—

NATIONAL GARAGE DOOR SETS

Doors equipped with these sets—**Work easily and efficiently.**
No binding or friction.
Adjustable in case of swelling or raising of cement floor.
Provide free and easy access to garage at all times.

Send for Garage Plan booklet F and give dealer's name.

NATIONAL MFG. CO.

STERLING, ILLINOIS

New Catalogs and Publications

658. **Portable saw rig** information may be obtained of the C. H. & E. Mfg. Co., Milwaukee, Wis., together with description of other contractors' equipment.

659. **The Koehring catalogue** on Dandie Concrete Mixers will be of interest to the modern builder who depends largely on concrete for both domestic and business buildings.

660. **Catalogue 48 of the Standard Scale & Supply Co.,** New York, describes hoists, pumps, air compressors, wheelbarrows, and other requirements of builders.

661. **A complete line of Portable Woodworkers** is described in the catalogue of the Knickerbocker Co., Jackson, Mich.

662. **Valuable information on Concertex,** the canvas roofing for roofs and porch floors and many other purposes, may be had from the illustrated booklet, "Roofing Facts and Figures." Wm. L. Barrett Co., New York.

663. **Stuko-Steel** is a new material with large possibilities for progressive builders. Illustrated literature obtainable from the Stuko Steel Co., Youngstown, Ohio.

664. **Vitrolite** will be worthy of the builder's attention for bathrooms and kitchens, and table surfaces. It is claimed to last, needs no paint or paper and is cheaper than tile. Vitrolite Co., Chicago, Ill.

665. **Blaw-Knox foundation and wall forms** may be learned of from the extensive booklets issued by that company at Pittsburgh, Pa.

666. **A window delivered complete in two bundles,** compact and efficient, is discussed in a free book published by the Anderson Lumber Co., South Stillwater, Minn.

667. **A wide range of information on Lumber** may be had from the Weyerhaeuser Forest Products, St. Paul, Minn. Every builder and prospective home owner should avail of the service offered to the fullest extent.

668. **Alpha Aids on concrete uses** may be had in a series of some two dozen service sheets issued by the Alpha Portland Cement Co., Easton, Pa.

669. **Everlastic Single Shingles,** manufactured by the Barrett Co., New York, are described in folders distributed by this concern.

670. **Shelter** is the name of an interesting booklet issued to describe Winthrop Tapered Asphalt Shingles. It tells about roofing from its earliest history.

671. **Federal Motor Trucks** will interest builders who are awake to the usefulness and reliability of a good motor truck, as described in the literature of this company at Detroit, Mich.

THESE catalogs may be secured direct from the manufacturer. If you prefer, write the date of this issue and the numbers of any catalogs on a postal and mail it to "Building Age," 912-920 Broadway, New York City. The catalogs will be sent you without charge or obligation.

672. **U. S. Mineral Wool Co.,** New York City, may be addressed with reference to mineral wool for building. This material when used for house lining is fireproof, vermin proof, and fuel saving.

673. **L. & I. J. White Co.,** Buffalo, N. Y., will send a folder on adzes, axes, and other tools which they have made for 84 years.

674. **Ideal Sheathing Paper.** Bermico, made by Brown Co., Portland, Maine, is described in leaflets to be had from them.

675. **Kodak on the Job.** Eastman Kodak, of Rochester, N. Y., publish a catalogue representing methods of recording the progress of building operations by photographs.

676. **Oil as Fuel.** Nokol Automatic Oil Heating is set forth convincingly in the booklet of the Steam Corp., Chicago.

677. **Illinois Zinc for Roofing** is fully described in the literature of the Illinois Zinc Co., New York. This should be in the hands of all builders and contractors.

678. **Wood Finishing** is illustrated in colors in the booklet of S. C. Johnson & Son, Racine, Wis., and written up for the practical builder and decorator.

679. **California Redwood Assn.,** San Francisco, circulates a 25 page booklet on the various special uses for California Redwood.

680. **Floor Surfacing.** American Floor Surfacing Machine Co., Toledo, Ohio, issues catalogue on saving time and money by the use of the American Universal.

681. **Slate Floors.** Old European Slate Roofs, and their advantages and beauty are illustrated in an attractive booklet to be had from the Knickerbocker Slate Corp., New York.

682. **Stucco and Flooring** is the name of a folder received from the American Magnesite Corp., Springfield, Ill., which gives the uses and advantages of this material.

683. **Complete lines of fireplace fixtures** and other metal conveniences for the house appear in literature sent by the Colonial Fireplace Co., Chicago.

684. **Hollow Tile houses** with floor plans are illustrated in colors in the folders of the Hollow Tile Bldg. Assn., Chicago.

685. **Kawneer Store Front** details may be had by writing Kawneer Co., Niles, Mich.

686. **General Gas Light Co.,** New York, will send interesting catalog with plans and construction details on proper building of fireplaces.

687. **Herringbone Metal Lath** is described in the illustrated booklets of the General Fireproofing Co., Youngstown, Ohio.

688. **Asphalt Shingle Construction** of a new and efficient kind is fully described and illustrated in folders issued by the Tee-Lok Roofing Corp., Chicago.

689. **Standard Electric Ranges** are given sixty pages of space in the catalogue of the Standard Electric Stove Co., Toledo, Ohio.

690. **Concrete Products** for builders are presented with photographs and construction details in the booklet of the Dexter Geare Corp., Miami, Fla.

691. **Valuable heating information** is given in much detail by the Co-operative Foundry Co., Rochester, N. Y., in a series of illustrated booklets. They cover both domestic and public buildings.

692. **Blue print,** drawing tracing profile and cross section papers and cloths may be examined in sample books furnished by the New York Blue Print Paper Co., New York.

693. **Kerner Incinerator** is a private garbage disposal plant claimed to perform its function most economically, safely, conveniently and hygienically. Very full literature on request. Kerner Incinerator Co., Milwaukee, Wis.

694. **Hard-N-Tyte Specification for concrete** floor finish is a new and important engineering proposition just set forth by the General Chemical Co., New York. Builders should know about this.

695. **Mar-Sla Mfg. Co.,** Youngstown, Ohio, describe new building material for which beauty, strength and economy are claimed. Builders should investigate.

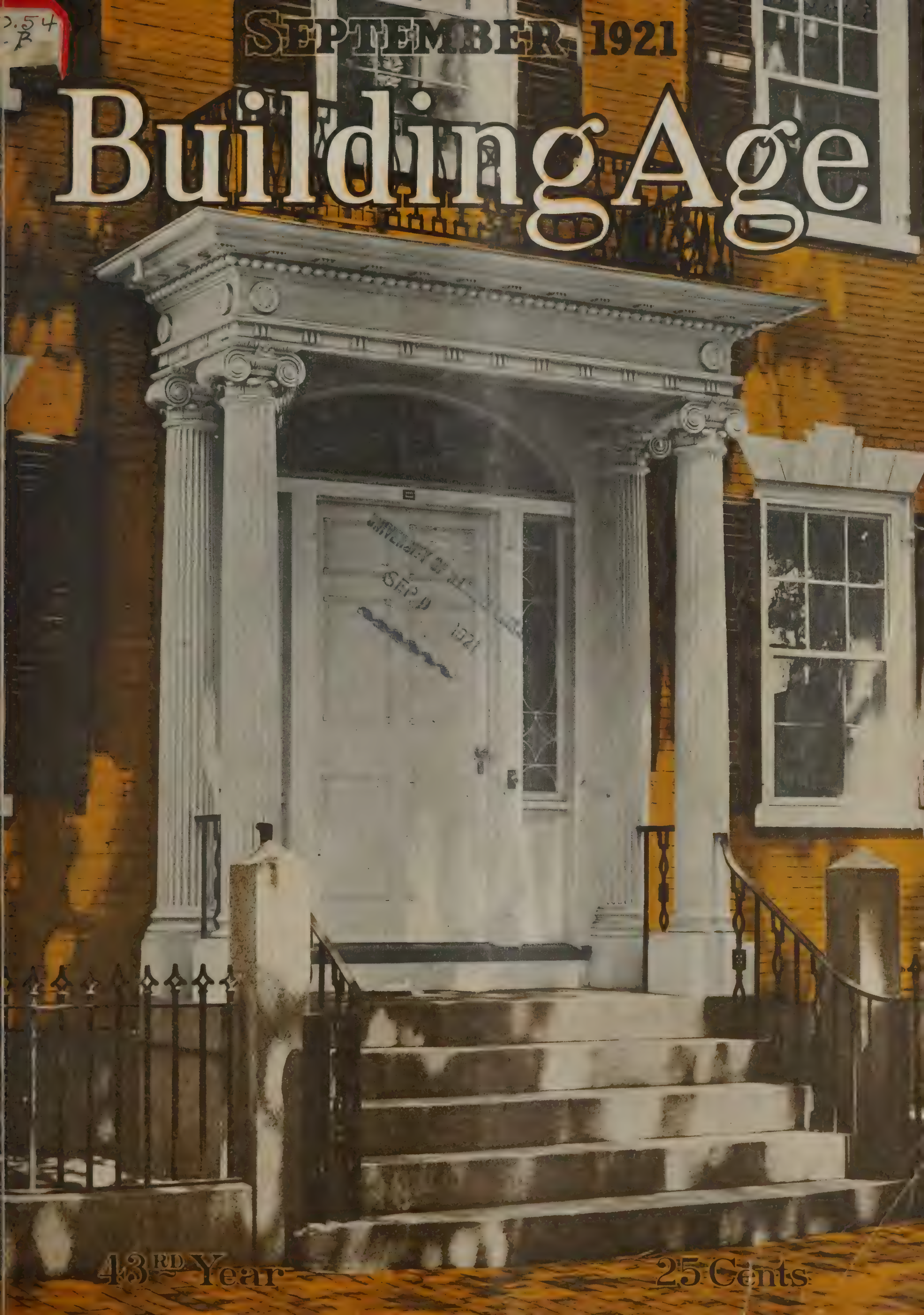
696. **ILG Electric Ventilating Co.,** Chicago, illustrates and describes kitchen ventilator which keeps odors from permeating the house. Installation details given.

697. **O. K. Clothes Dryer Co.,** New York, circulates interesting information of value to housewives on drying device for laundry.

698. **Diamond Metal Weather Strip Co.,** Columbus, Ohio, will supply interesting booklet to those desiring it.

SEPTEMBER 1921

Building Age



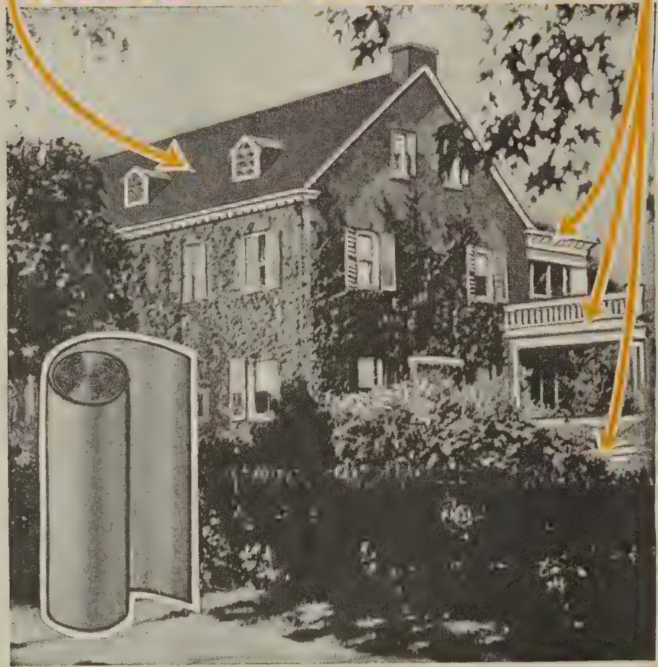
.54
B

UNIVERSITY OF
SEP 9 1921

43RD Year

25 Cents

CON-SER-TEX
FOR
ROOFS AND PORCH FLOORS



CANVAS ROOFING
For Flat Roofs
and Porch Floors

—an attractive, water-proof, rot-proof, mildew-proof covering that will not crack, stretch, shrink, curl or peel. The chemical treatment applied during manufacture makes it the most advantageous material for use in covering floors, flat roofs, sun parlors, sleeping balconies, and the like. Cool in summer, and easy to keep clean. All these features explain why it has become such a favorite with owners.

Carpenters and builders should push "Con-ser-tex" Canvas Roofing, because it enables them to secure many contracts for work on which more expensive material would be out of consideration. If you show your clients how to save money on roofing, they will let you show what service you can render them in other directions too. Con-ser-tex is easy to lay, and brings a good margin of profit.

Write for illustrated booklet, "Roofing Facts and Figures," and for samples.

WILLIAM L. BARRELL CO. of N. Y., Inc.
50 Leonard Street New York City

Chicago Distributors:
Geo. B. Carpenter & Co.
430-440 North Wells St.

California Distributors:
Waterhouse-Wilcox Co.
San Francisco & Los Angeles

FLOORS
The Wood-Mosaic Kind

For every home—Old or New. Can be installed by your mechanics. Our 5/16" flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood Carpet, strips Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalogue in natural wood colors.

Wood-Mosaic Company
New Albany, Indiana

M&F Co TRADE MARK Fiberlic

Fiberlic
Wall
Board

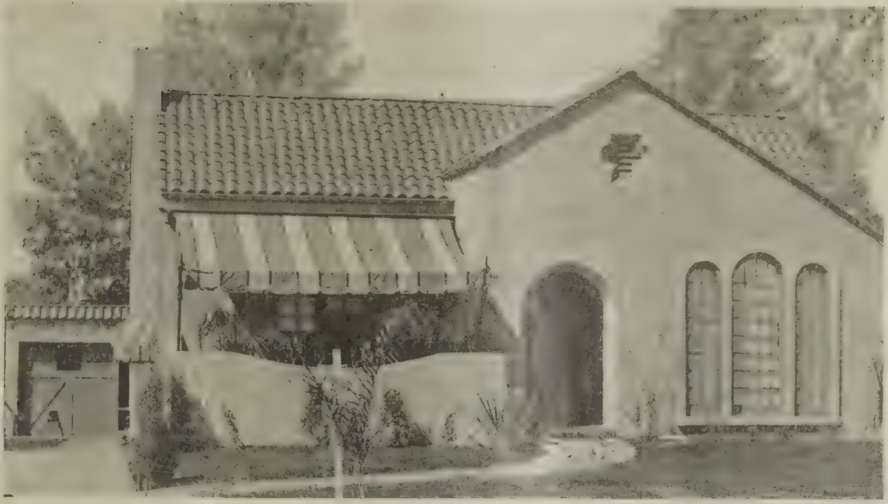
The *material* from which it is made, the fact that the pulp is *chemically cleansed* and that the *fibre lengths* give the finished product that *natural reinforcement* that is lacking in ground wood boards, is in itself a guarantee of the superiority of Fiberlic for *strong, permanent, economical* and *sanitary construction.*

MacAndrews & Forbes Company
200 Fifth Avenue, New York City
Factory: Camden, N. J.

BUILDING AGE

NEW YORK, SEPTEMBER, 1921

A Modified Spanish Type of Bungalow at Los Angeles, California



Designed and Built by the De Luxe Building Company. Cost $5,000

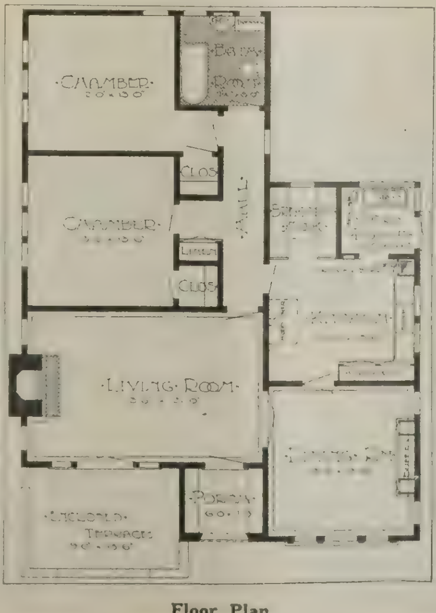
Bungalows for $5000 Popular With Home Builders

Two Different 5-Room Types Costing $5000 and $3500 Respectively

HERE is one of Calfornia's newest interpretations of the Spanish style of architecture. This bungalow, containing five rooms and bath, presents an exceptionally attractive outside appearance. Its interior has been handled along the lines that have made the bungalows so popular and is a decidedly practical and convenient arrangement.

Features and details that contribute materially to the attractiveness of the exterior are the little vestibule-like entrance porch, with its arched doorway, the small wall-enclosed terrace and garden plot on a front corner, accessible from the living room through French doors, the triple arrangement of full-length, rounded-top windows in the main front wall, the unique design of the attic vent in the front gable, and so forth. Then, too, the general structural lines, the materials themselves represented in the construction, and the color scheme—particularly the rather striking combination of colors—also naturally add much to the outside charm of the little house.

The walls are of cement-stucco over frame construction, and are finished in a deep tan shade, while the roof is of dark red roofing tile. The trimming, confined almost exclusively to the window sash, is done in olive-green. Over the walled-in-terrace and garden on the front and above the windows on the south, or along the driveway, however, are awnings in stripes of bright orange, black and deep cream, lending still additional touches of contrast. The walk gracefully curving away from the automobile driveway to the front entrance is paved with cement cut into slab-like sections, to simulate flagstones, with grass growing between, and the entrance vestibule is floored with red cement, while the door leading therefrom directly into the living room is rounded at the top and is of glass.



Floor Plan

The arrangement of the interior will be seen from the floor plan. Notice should be taken of the fact that a pair of glass doors is introduced to connect the living room and dining room, and also that the comparatively short hall provides direct communication with every room except the dining room. The dining room has a buffet; the hall, a linen cabinet; the bath room, both a medicine-case and a shelf and drawer cabinet; each of the bed rooms, a good wardrobe closet; and the kitchen a draught cooler-closet, a disappearing or cabinet ironing-board, a plaster hood for the range, a liberal quantity of cupboard room and the other usual conveniences. Directly off the kitchen is a practical breakfast nook with the customary built-in seats and table.

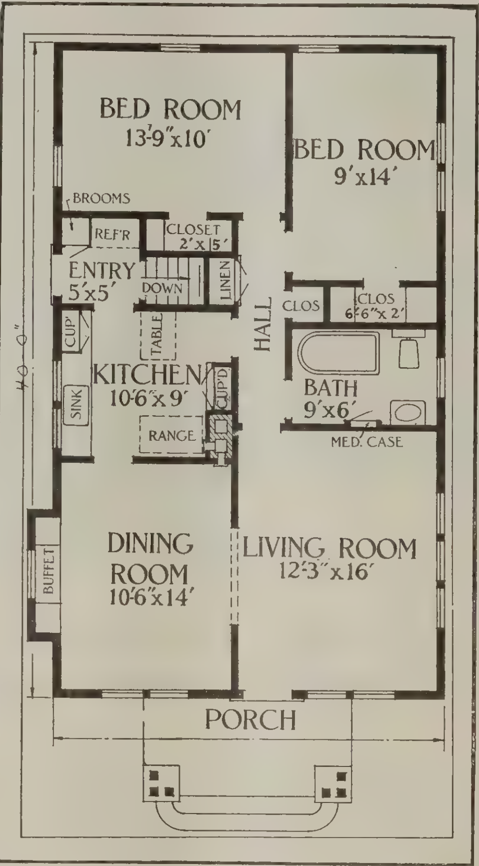
The interior woodwork is of pine throughout, except for a limited use of mahogany trim in the living room and dining room. The pine woodwork in these two rooms and in the hall and bed rooms is finished in old ivory style. In the bath room and kitchen, as well as in the breakfast nook, it is in white enamel. Oak flooring is used throughout, except in the bath room and kitchen. Tile is used in the former of these and pine in the latter. The walls in the bath room and kitchen are finished, to a height of about five feet, with a smooth, hard plaster coat which is enameled like the woodwork, and elsewhere they are papered. The fireplace in the living room has a tile hearth and a wood mantel of modified Colonial design.

The house has neither basement nor cellar, but it is equipped with gas radiators built into the floor for heating and all other modern conveniences. It is located in Los Angeles, California, and was designed by the De Luxe Building Company, of that city.

THE second bungalow type illustrated, is a model for economical post-war building. It constitutes a compact and convenient easily-owned home. It has a concrete foundation and a good cellar, with an inside stairway, and contains a good assortment of closets and labor-saving and furniture-saving built-in features.

The outside walls are of narrow siding, painted light gray, and the trimming is done in dark gray, while the shingled roof is green. The front porch is floored with cement.

The house has a frontage of less than twenty-six feet, and hence is suitable for a lot as narrow as forty feet, with sufficient room left for a driveway. It contains five rooms and bath. The dining room has a good buffet; the kitchen, a lot of cupboard space and the other usual conveniences; the rear entry porch, a closet for brooms; the bath room, a medicine case; the hall, both a linen cabinet and a closet for wraps. Each of the two bed rooms has a roomy closet.



Floor Plan

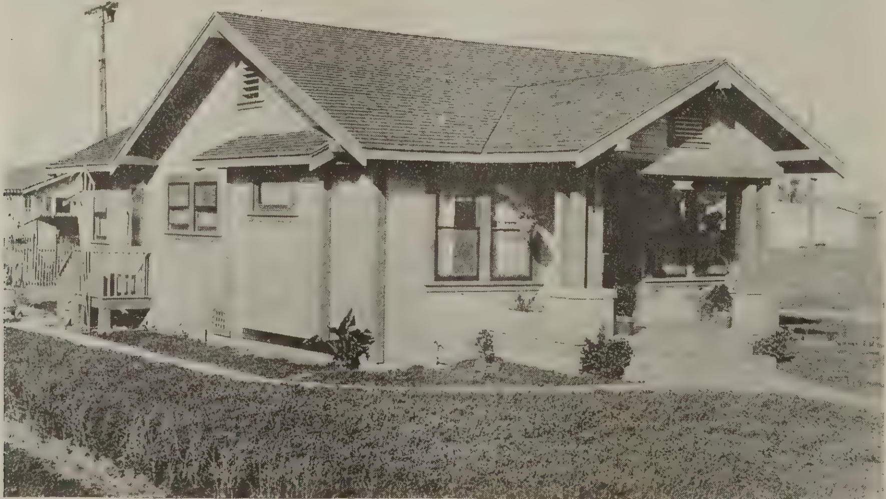
The interior finish is very simple but new and conducive to being made homey. The pine woodwork of the living room and dining room is finished in fumed oak satin, and in the other division, it is in white paint and enamel. The two front rooms have hardwood floors, and their walls are papered. In the bath room and kitchen a smooth, hard plaster coat, enameled like the woodwork, is used for finishing the walls to a height of about five feet, and their pine floors are covered with linoleum.

This little bungalow is located in Los Angeles, California, and the plans are by E. W. Stillwell, of that city. The estimated average cost for present building is from $3,500 to $4,000, complete, ready to move in.

There is a large popular demand for bungalows today. There are two reasons for this. First, a bungalow is cheaper to build than a 2-story house. Second, the scarcity and high cost of servants has developed a need for houses with rooms on the one floor for the convenience of the housewife.

The types presented here are quite different. The first is more expensive and probably more attractive; while the latter is more economical.

E. W. Stillwell, Architect. Estimated Cost $3,500 to $4,000 Complete



Economical Post-War Type of Frame Bungalow Los Angeles, California

Cutting Labor Costs on Double-Wall Concrete Houses

Western Builders Using Steel Forms—Material and Labor Cost for 100 sq ft. Finished Wall 300 Dollars

By H. W. REMINGTON

ADJUSTABLE steel forms have given a method of building concrete walls that is both practical and economical. In the August issue of BUILDING AGE one method of building the solid type of wall was fully discussed. Another type of form makes it possible to build a double wall with an insulating dead air space in the center. It is interesting to know that skilled labor is not required in the construction of these types of walls. With the forms shown in Fig. 5 three common laborers pour 150 linear feet of concrete wall per day. Assuming, therefore, a house 25x50, three men are required for one complete course, 2 ft. high, per 8 hr. day. This includes stripping forms from the previous day, relocating them and mixing and pouring concrete. The mixture stays overnight and the forms are stripped the next morning and located for the next course.

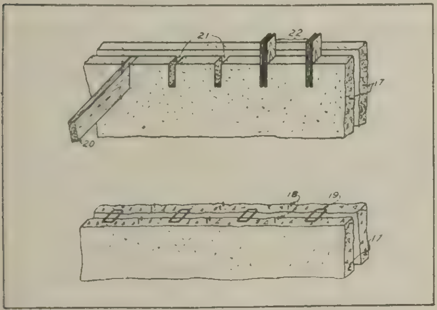
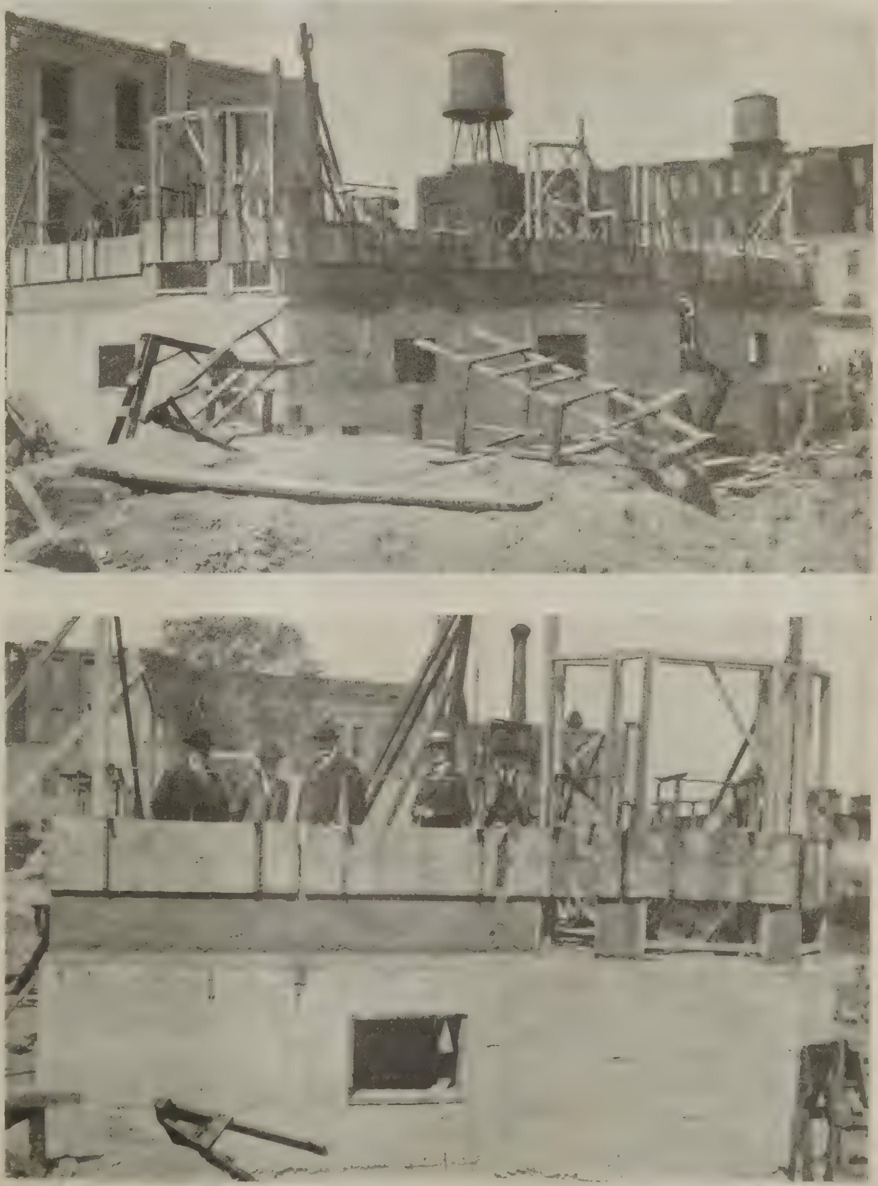


Fig. 1. Method of Placing Joists and Tying Reinforcing Bars Together

The method of operation of this particular type of form is shown in Figs. 6 and 7. Fig. 6 shows the form being removed from the wall which is done by collapsing the turn-buckle as shown. Fig. 7 shows the form in place for a second pouring. The wedge shaped tongue is forced downward in placing the forms on the well. This spreads the center piece, thereby grabbing the hollow space of the wall at that point as well as by the outer faces. The inside wall thickness is adjustable to 3, 4 or 5 inches and the walls are reinforced by two bars to every foot, as shown in photographs. The two walls are tied over 18 inches of weaving tie wires around the reinforcing rods and the perpendicular reinforcing rods tie the courses together, making the completed house a solid rock.

Fig. 1 shows how blocks are handled to the inside faces of the forms to provide openings in the concrete floor for the floor joists. It also shows a method of tying the perpendicular forcing rods together. Fig. 2 and 3 show the method of placing the window frames and the method of pouring the walls while



Figs. 2 and 3. Concrete Houses of the Double Wall Type Under Construction in New Jersey, Showing Forms in Place

the window frames are standing. These frames must be plumbed and braced carefully and tied together at the top by small handling strips to prevent spreading. When the forms reach the top these strips are removed and the pouring operation continues as usual. It will be noticed that the window frames are split to permit of the passage of the center tongue of the form.

Various stages in the construction work are shown in the accompanying illustrations as well as some of the finished houses that have been built with Frost forms by the Hall Concrete Wall Company, Mitchell, So. Dakota. The rough walls of this house were plastered inside and finished outside with stucco. In this instance lathing was used, the rough surface furnishing sufficient bond for the finish. The advantages of the air space in the concrete wall have long been recognized and since the development of this type of construction considerable study has been given to securing these advantages economically. The forms described here give an unusual air space 2 inches wide with no construction between the inner and outer sections except the heavy galvanized ties. The ventilation which is secured insures dryness in the house and the well known insulation of the air space gives an added warmth in winter and coolness in summer.

Fig. 5. Showing Forms with Toggle and Core

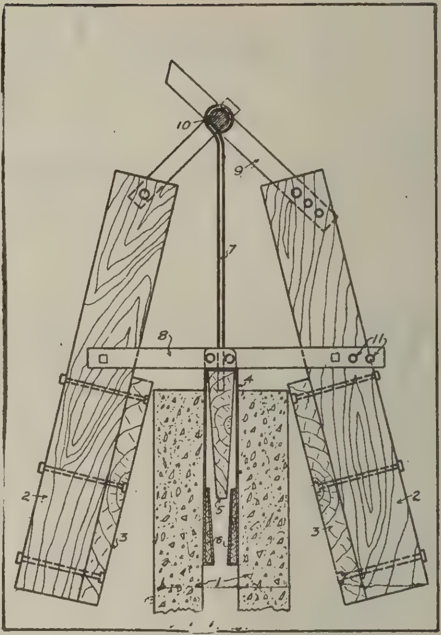
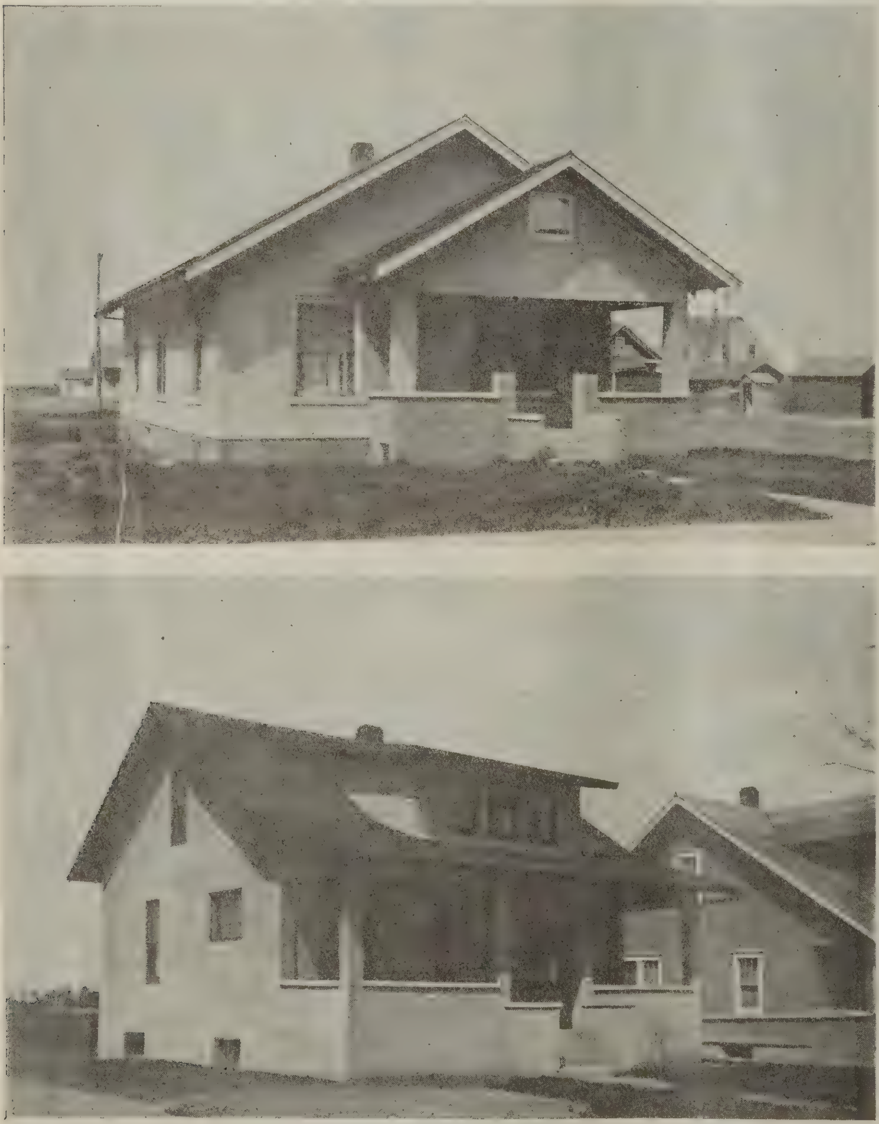


Fig. 6. Stripping Forms


Figs. 3 and 4. Some of the Types of Double Wall Concrete Houses Recently Built in Nebraska with Frost Forms

It is interesting to study the simplicity of the operation of this type of form. Only one movement is requires to loosen or to clamp the molds, namely, pulling up or pushing down on the toggle. This same movement clamps or loosens the inner core. The core is made of sheet steel and the outer forms of wood, which can be replaced easily scarred or worn.

The sections used on these jobs were from 18 to 24 inches high and varied from 4 to 8 ft. in length. Angles in the walls were formed by drilling new bolt holes in the pipe and moving one side from the other far enough along to make the required angle. In a similar manner corners are formed by special molds in which the outer plank is longer than the inner by an amount equal to the thickness of the wall. In one of the arms of the toggle several bolt holes are provided, as well as in the lower pivot piece. This permits the adjustment mentioned before whereby the thickness of the wall may be varied from 3 to 4 to 5 inches as required.

No attempt is made to secure a smooth wall free from pockets since the wall itself is eventually finished with a float and dash cut of stucco. In fact, this is considered an advantage of having a certain amount of

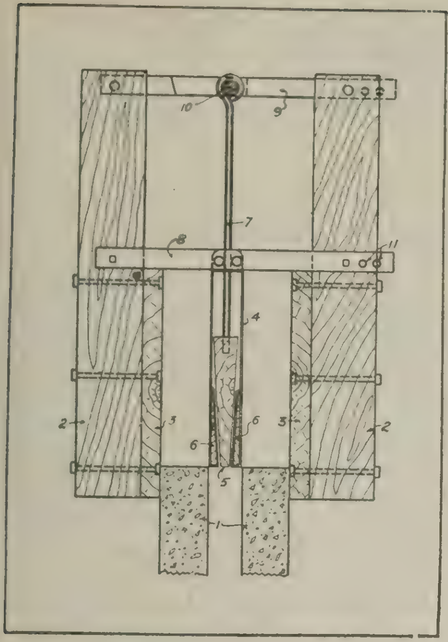


Fig. 7. Forms in Place

roughness and voids in order to secure a mechanical key for the stucco coat.

Steel reinforcement mentioned above consist in this house of ⅜-in. bars shown in the photographs.

The cost of material and labor in this house was carefully kept. The unit cost per 100 sq. ft. of finished wall, 3 inches outside 2 inches of air space and 3 inches inside, has been computed from these costs and is tabulated as follows:

Unit Cost Material and Labor

100 sq. ft. finished wall 3 & 3 in. with 2 in. air space requires:

2 yds. of sand and gravel, at $1.50 per yd	$3.00
10 sacks cement, at $0.75 per sack	7.50
Wall ties 7 reinforcing	2.00
11 1-9 yds. outside finish	5.50
11 1-9 yds. inside finish	3.00
Labor to construct walls	6.50
	$27.50
Contractors' profit 10% of $27.50	2.75
	$30.25

Assuming, therefore, a bungalow type of house 25x50x16 ft. high, the cost of the finished concrete double walls on this basis, including inside plaster and outside stucco, would be $600, which is a remarkably economical performance.

This article describes only one of the methods of double-wall concrete construction. It will be noted that one complete course of concrete is poured at one time, allowed to set partially over night and the forms removed the following day. It has been in considerable use in the Middle West, where three men handle the setting of the forms, the mixing and pouring of the concrete and the stripping.

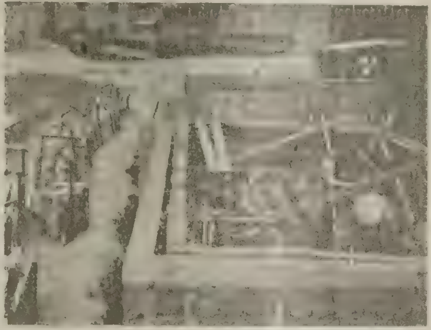


Fig. 8. Double Wall with Forms Removed

Such a system is best adapted to the building of a number of houses at a time. In such case a concrete mixer will handle the entire job of mixing and a portable tower should be used for the placing of the concrete. This would serve to further reduce the labor cost. Another system that has been developed considerably in the East consists of a type of form (or machine, as it is called), that makes one section of a course at a time, and is then unclamped and moved ahead to make the next section. This is an entirely different method from the western system described here.

Raisins

You've heard about the raisin
With the kick of 10 per cent,
But the raisin with the wallop
Is the raisin' of the rent.

Figs. 9 and 10. Some More Types of the Nebraska Houses Built With Double Wall Forms

Placing Building Materials on the Job

Methods That Have Enabled One Contractor to Reduce Unit Labor Estimate Ten Per Cent.

By **MORGAN FARRELL**

Director of Construction, Miller, Franklin, Bassett & Co., Industrial Engineers

LOOK at any construction job in process; and mark the placing and stowage of the construction materials. A quick analysis shows disorderly heaps with the wrong stuff on top, and perishable goods exposed to the weather, all dropped wherever they happened to fall with no thought of accessibility or of the order of use.

On big jobs, the superintendent is usually broad-gauged enough to plan intelligently where he is going to put stock as it arrives, whether it comes in the right order or not. There is no reason why small jobs cannot be planned the same way, even during the busy days of starting work. The final saving is surprising.

Take, for instance, a two-story frame dwelling, with concrete foundations, shingle roof, etc., of the usual suburban type. It is 24 ft. x 36 ft. with a sun parlor at one end.

Here is the way to go about laying out the plot for efficiency:

I. Prepare a memorandum like Fig. 2, which lists all bulk material about in the order of use, stating quantities roughly, and whether stored in the open or under cover. Place opposite each item the approximate ground space and shed room required. Pin this up in the office where it can be seen.

II. Make a list of plant and tools needed: barrows, picks, shovels, tackle, extra carpenters' tools, etc. We will assume that a gasoline driven small batch concrete mixer with hoist crab mounted on the frame and a power saw are to be used. (They more than pay for themselves, but that is another story.)

III. We are now ready to assign space on the plot to each class of material. It is generally possible to drive teams around the lot about as indicated in Fig. 1. The mixer is set up on one side of the house, with stone and sand piles adjoining and runways near them leading up to the charging hopper. The saw is set up on the other with rafters, beams, studs and sheathing in separate piles with space between, behind the saw. Here the concrete forms are made and studs, rafters, etc., cut to measurement.

On the third side are placed miscellaneous materials such as plain, face and fire brick, tile, flue-lining, etc., arranged in separate piles with space between. The fourth side is turned over to the plumber, steamfitter, electrician and sheet-metal worker, who club together for a storage shack, with pipe-racks, fittings bins and work bench.

The general contractors' shed must be large enough for cement, line and plaster, and for trim, flooring, hardware, paint and tools. Due allowance will be made for the using up of some materials before others arrive on the site. The office completes the layout.

The sheds and office are a study in themselves and can easily be standardized to avoid the usual unsightly mixture of blue prints, delivery slips, clothes, tools and odds and ends. There can be a place for everything, and the working force can soon be taught to see that everything is returned to its place when not in use.

It is impossible, within the limits of this article, to go into any great detail. Our purpose is to indicate that building operations can be planned and standardized like any other production activity. One contractor who has been working along these lines for some time states that he has been able to reduce his unit labor estimate on concrete work, framing and handling, by ten per cent. In addition, by being able to tell at a glance how each class of stock stands he has completely eliminated high-priced "hurry-up" orders for stock

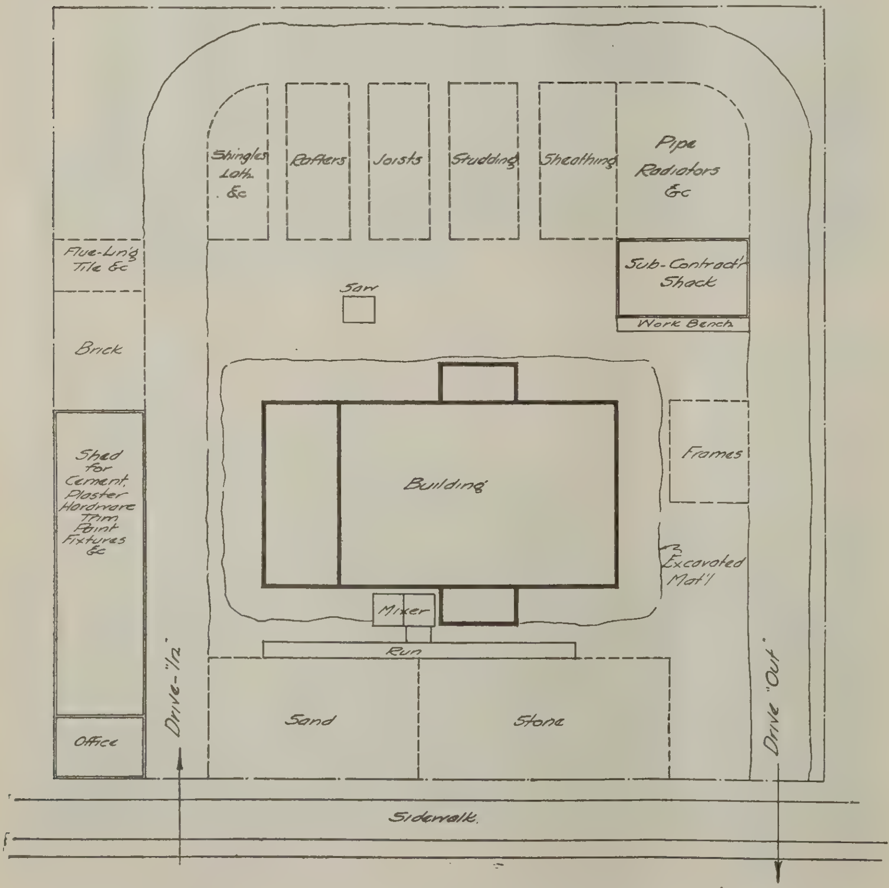
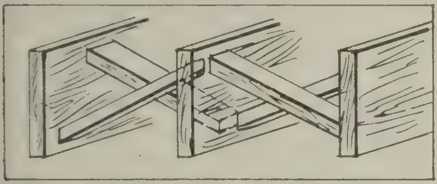


Fig. 1. Layout Showing Method of Placing Material on the Job for Efficient Handling

which has unexpectedly run out. Incidentally, his job records are in better shape, tool losses minimized and time lost hunting for material reduced to nothing.

The Right Way To Use Cross Bridging

THE best type of bridging is the cross bridging shown in the accompanying illustration. In this type, the cross pieces are of 1″ x 4″ stuff in small work and 2″ x 4″ in large work. The top and bottom of each cross piece must butt against that part of the joist against which butts the corresponding part of the adjacent one, as shown in the illustration.



Cross Bridging Pieces Should Butt Against Each Other to Prevent Eccentric Pressure

The primary purpose of cross bridging is to distribute a load and to stiffen the joists so that they will not turn or twist. With cross bridging, joists will keep their shape better. This means that there is less liklihood of the plaster cracking on the ceiling below. Furthermore, a bridged floor is more pleasant to walk on, and frequently a weak, shaky floor can be made all right by inserting bridging.

Bridging does not strengthen a floor. It only stiffens it. If there is a concentrated load, the bridging will help distribute it over eight or ten beams, instead of over only one or two. The bridging is usually put on 8 or 10 ft. centers. It should be nailed before the flooring is on, because otherwise the initial strain comes on the flooring instead of on the bridging, and irregularities are made permanent.

There is a type of bridging in which planks are cut and nailed in between the joists horizontally. This kind of bridging is practically useless, as the cross pieces shrink away from the joists and then can do nothing to stiffen them.

In cutting the cross bridging, the proper bevel of one piece can be found with the steel square, and then this first piece is used as a pattern for the rest. This would seem to be self-evident were it not for the many carpenters one sees acting as if cutting bridging were a fine art instead of a simple matter if done right. If a power rig is owned, then it is a very simple matter to cut all that is needed in a very few minutes. Indeed a good rig will pay for itself on the one job if proper use is made of it.

Care should be taken to see that the ends of the cross pieces have a firm, true bearing on the joists. This part of the job is frequently botched, and it is generally possible to tell how carefully a house has been built by the way in which the bridging has been fitted. Well fitted bridging almost always means that a good, careful builder has been on the job.

Class	Open Storage			Covered Storage		
	Material	Quantity	Sq Ft	Material	Quantity	Sq Ft
Mason	Stone	100 yds.	500	Cement	100 bbls	250
	Sand	100 yds.	400	Lime	20 bbls.	
	Brick	12M	180	Plaster	150 bbls.	
	Flue Lin'g	90 ft.	80			
	Tile	2 bbls.				
Carpenter	Beams	6 MBM	160	Sash		250
	Stud'g	8MBM	180	Doors		
	Rafters	4MBM	150	Trim		
	Sheath'g	10MBM	200	Siding		
	Frames		140	Flooring		
	Shingles	7M.	140	Paper		
	Lath	15M.				
Metal				Hardware		100
				Flashing		
Paints				Paint		100
				Oil		
				Varnish		
Plumbing	Pipe		320	Fixtures		
&	Tile			Fittings		
Steam Ftg	Radiators					
	Furnace					
Electric	Conduit		80	Wire		100
				Fittings		
				Fixtures		
Tools				Tools		50
BluePrint				BluePrint		90
&						
Papers				Papers.		

Fig. 2. Memorandum of Bulk Material Arranged in Order of Use on the Job

Interior Flat Finish

APPLY the undercoats in the usual manner, but add oil to the last coat but one, so that it dries quite glossy. Apply to this a flatting coat made from pure zinc oxide, ground in oil, with the addition of a little raw sienna. Mix turpentine fairly liberally with the zinc and let it stand overnight. Then pour the clear turpentine off the top, and this will have the effect of extracting the oil from the zinc. Now add a little first class liquid zinc dryer and you will have a paint, which will be found easy to apply and will dry quite free from gloss.

The Kind of House Mrs. Farmer Wants

Facts About Farm Houses That Builders Should Know

By **WILLIAM DRAPER BRINCKLOE, Farm Architect**

IT was ten years ago that I took over the "Farmhouse Page" of the largest farm papers in America. Month by month, I showed sketches and plans for "A Convenient Farmhouse," "A Pretty Little Farm Cottage," "A Comfortable Farm Home," or whatever catchy title popped into my head. No doubt these houses really were convenient, pretty and comfortable; I had been designing such homes for years, and the wives of my city and suburban clients were mighty well pleased with the work I did. But, somehow, my plans didn't seem to suit the farmers' wives, and it was years before I finally grasped the reason. Here it is: A farmhouse must be planned to fit the daily life of the farm folk who live in it, *and this life is very different from the life of a city or suburban family*. You might just as well try to force a paint-factory plant on a steel manufacturer, as to force a village house-plan on Mrs. Farmer; though very few builders or architects seem to realize this. But give Mrs. Farmer the sort of house she wants, and you'll soon have all the business you can attend to, Mr. Builder!

Now, just what sort of house does Mrs. Farmer want?

Let's look at Figs. 1 and 2 a moment—a very practical little farm cottage. You notice, of course, that the first floor plan (Fig. 1) has several very odd and unusual features; I'll run over these, briefly, quoting the reason for each, from the letters which thousands of farm women have written me.

The little washroom is *absolutely necessary;* better leave out the living room than this! "I want a place where the men can come in, from the fields or the barnyard; a place for them to clean up, take off muddy boots and messy overcoats, and so on. I want the house planned so they can go right from this washroom to the dining room or to their bedrooms, without going through the kitchen; it gets on a woman's nerves awfully to have the men traipsing and crowding through the kitchen when she's all stewed up, hurrying to serve a meal."

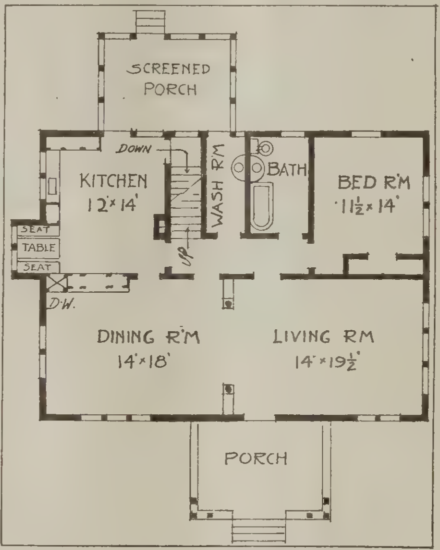


Fig. 1. First Floor Plan of 1½-Story House

Now. consider the kitchen. "I want it neither too large nor too small" (the average is about 12x14). "We farm folk eat breakfast there and many of the other meals, too, unless we have guests" (the little Pullman-car breakfast nook is very popular, though not absolutely necessary). "I want *lots* of cupboards, closets, and flour-bins, all around the kitchen, so my groceries will be right at hand; I don't want a pantry, for it means a lot more steps, trotting in and out a million times a day" (occasionally, however, she does want a pantry; better make sure before you start planning). "The sink must be set high enough so I won't get a backache every time I wash the dishes; there must be a window over it, with the sill 3½ or 4 feet from the floor, so the glass won't get splashed. This window ought to look toward the road, somehow; it's a great comfort to a woman in a lonely neighborhood to see someone passing now and then, and have a little something to think about besides her troubles and her work."

A dumb waiter, from kitchen to cellar, is in *very* great demand. "Ice is hard to get, on the farm; so, after a meal, I put the perishable foodstuffs on my screened dumb-waiter and drop them down to the cool cellar, until next mealtime. And I use my dumb-waiter to bring up fuel, canned goods, and winter vegetables; this saves a lot of heavy lifting."

At least one first-story bedroom is always wanted. "It's a tremendous convenience to me, in case of sickness or babies, or if some aged parent must be cared for; of course, there must be a toilet right close." When not used as a sickroom, this often serves as an office. "My husband needs a place where he can be private and quiet, to write his business letters, read his farm magazines and

Two-Story Farm House Planned for the Convenience of Mrs. Farmer

government bulletins, see the buyers, pay his farmhands, and all. But be sure to have some way to come in, *not* through the front of the house; else he and his callers will track an awful lot of mud and manure over my living-room floor!"

The first-story bathroom, even in a full two-story farmhouse, is almost a necessity. "We haven't enough pressure to raise the water to the second story;" "We have no water system, except a hand pump; we carry hot water from the kitchen stove;" "I want to oversee the kiddies when they bathe, wash, or use the toilet, without my having to leave my work;" "I want a lavatory and toilet, very near the kitchen; it will save me a lot of steps, in the course of the day"; and so on. We must remember that a farm woman spends far more time in or near the kitchen than any other woman does.

The dining-room is quite large, and the living-room opens into it. On many farms, threshing crews or other big groups of men must be fed, every so often; the tables must frequently extend into the living-room. And even on ordinary occasions the farm family, with hired men, callers (who usually stay to a meal—distances in the country are too great for the casual ten-minute call), and so on, is far larger than the town family. Usually, the dining-room serves also as the daily sitting room; the living-room is rather reserved for special occasions. "City folk poke fun at us, for keeping a 'parlor' for company; but city folk don't have a lot of men coming in from the fields or the stables, and smearing dust, chaff, manure, or mud all over floors and furniture ten minutes after the room has been cleaned. Do you blame us for wanting some place where we aren't ashamed to take our guests?"

The front stair hall is very seldom wanted. "We all come in, and go out, at the back of the house; that's the nearest way to the barns, fields, chicken-yard, and garage. Even our friends drive around to the back; they know they'll find us there." So the stairway is toward the rear, and the reception-hall is omitted.

A large *screened* back porch is almost always wanted; "We eat here, in summer, and I do a lot of my work here. I want the porch to be weatherboarded in, to a height of 3 feet or so; in winter, I'll put glass sash above this."

I haven't shown the second-story plan; it has three large, cool bedrooms, and a small room that may be used as bath or store-room. The front bedroom, with sash removed, is really a sleeping porch; a feature that farm folk are beginning to demand.

Very often, instead of a story-and-a-half house, Mrs. Farmer wants a regular two-story affair of the square type; four rooms downstairs, and four above, with an attic for storage of seed-corn, etc. Figure 2 shows the first-floor plan of such a house. Here the laundry is tacked on, as a lean-to; it also serves as washroom. "I like a laundry right on the ground level, so I won't have to lug heavy baskets of clothes up and down stairs." The type of stairway shown here, with a grade door on the lower landing, is extremely popular; it occurs again and again in modern farmhouses.

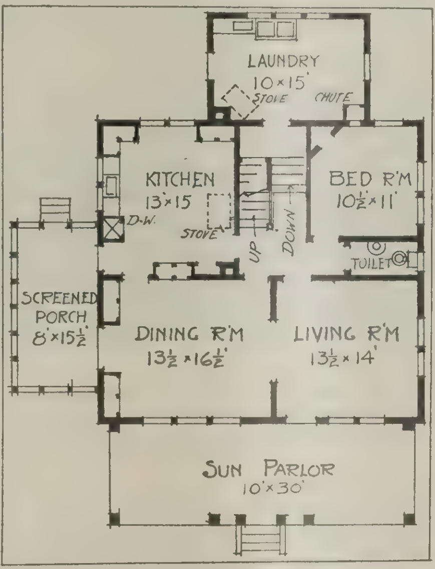


Fig. 2. First Floor Plan of 2-Story House

Now, I might go on for pages and pages, showing and discussing typical farmhouse plans, but I haven't space. However, here's hoping these few words may be of some help to you, when you go after the farm house business; a mighty large and profitable business it is, too!

Creosoted Wood Silos

THE wood-preservation studies at the Forest Products Laboratory have shown that the value of wooden silos can be greatly increased by proper treatment with coal-tar creosote. A good creosote treatment will not only increase the durability of the wood, but will reduce the tendency of the staves to shrink when the silo is empty. A creosoted silo cannot be painted afterwards; however, it does not need painting, for the creosote protects the wood, and its color is pleasing.

Highly durable woods, such as heart cypress or redwood, do not need protection against decay so much as the non-durable woods, but a thorough creosote treatment will make the non-durable woods, such as sap pine, last longer than durable species will without treatment.

Contamination of the silage by creosote from the staves need not be feared. This is borne out by experiments and by careful inquiry among the many farmers who have used creosoted silos. In order to be quite sure, it is well to allow the creosoted staves or the finished silo to stand a few weeks before filling.

The most thorough creosote treatment can be given by pressure methods. If pressure-treated wood is not available, very good results can be obtained by the hot and cold bath treatment. If a good penetration of coal-tar creosote is obtained by either of these processes it is not too much to expect the silo staves to resist decay 25 or 30 years.

Other methods of creosoting, such as painting, spraying, or dipping, can be used. They are less costly than the pressure treatment, but they are also less effective. They will probably add several years to the life of the silo and thus pay for themselves, but the more thorough treatments should be used wherever possible. Instructions for treating silo staves by these various processes may be obtained from the Forest Products Laboratory, Madison, Wisconsin.

Spray Painting

THERE can be no question about the fact that paint spraying on large surfaces is quite practical and effects an immense saving of time. A large front can be painted down by spraying in quarter of the time it can be done by brush. The pumping apparatus is mounted on a trolley and moved from place to place, as required. The actual spraying is done from a painters' boat or swing scaffold, which is lowered or shifted from side to side, as may be required, as the work proceeds. The spraying apparatus could also be used for inside work, but it is not so suitable.

Why Bricks Vary in Quality, Shape and Size

Some Things That Buyers and Users of Bricks Should Know

IN the making of building bricks, two types of kilns are in common use, the updraft and the down draft. There are also continuous kilns and tunnel kilns, which have not yet come into general use.

The updraft kiln is the old style kiln, generally square or rectangular. It has an open top, with only roof enough to protect the bricks from the rain while they are being set, but with enough openings to permit of a perfect draft upward. The heat, after reaching the top of the kilns, passes off and is lost. Sometimes the entire roof of the kiln is removed after the fires are well started. This type of kiln will probably develop around 1,200 degrees of heat, but the temperature is generally guessed at and not registered by a pyrometer.

Great Heat Hardens Brick

The downdraft kiln is a modern invention, developed primarily for the purpose of obtaining a higher temperature and thus making a harder brick. The temperatures will run around 1,800 and can be made higher. These kilns are frequently bee-hive shaped, though there are some rectangular ones. They are closed at the top. The heat from the fires at the bottom of the kilns passes up to the top and is then drawn down and passes out at the bottom into a tunnel that conveys it to the dryers, where it is used to dry the green bricks preparatory to burning them. The heat is under control and can be increased to over 3,000 degrees, as it is in making some kinds of bricks used in the furnaces of steel mills. Usually, in the making of building bricks, the heat is considerably under 2,000 degrees, which gives a satisfactory degree of hardness for building purposes.

Most of these so-called "common brick" are produced in updraft kilns. In some cases, the burners claim to produce as high as 90 per cent. of hard common brick, while other burners say they do not produce more than 50 per cent. of hard bricks. The soft bricks are not good for facing, as they are subject to the action of frost. They are used for backing and for other work where they are protected from the action of the weather.

Freshly-made bricks have to be dried till they can be handled for setting in kilns. Two systems of drying are shown here. Two long buildings in rear are for drying by steam and have a capacity of 37,000 bricks per day. In the foreground are shown open air drying racks having a capacity of about 177,000 in three days. Open air racks give good results but can't be used in freezing weather.

Updraft Kilns. Roofs are made open to give free draft. Capacity of this plant, one million bricks at each "turnover" of four kilns. Process (about) one week setting green bricks; one week burning; one week cooling; one week emptying. Process starts about a week apart in each kiln. Time varies with different manufacturers.

In the regions where the clays or shales make a red brick, the soft brick is salmon in color and is called a "salmon" brick by the trade. These salmon bricks are slightly larger than the hard bricks burned in the same kiln, as they have not been subjected to the same degree of heat and have not shrunk as much as have the other bricks. This is a thing that must be taken into consideration by anyone purchasing them.

Measuring by the "Settle"

This shrinking of the brick in burning leads to a great variation in size. Brick burners determine how much their bricks have shrunken by what they call the "settle." Thus, at one plant, the settle worked for is 10 inches in an aggregate of 42 layers of bricks placed on edge. At this plant, they were unable to dispose of their salmon bricks during a period of about two years, so they reburned them, making hard brick out of them. Their settle in this second burning was 8 inches, showing that in the first burning they had shrunk only 2 inches, or one-fifth of what the hard bricks had shrunk. This would equal about one-fifth of an inch in the width of each brick, as between the salmon and the hard brick produced by the same kiln.

Different Standards of Manufacture

This variation in size of bricks is further complicated by differing standards among the manufacturers.

This plant has four downdraft kilns and three updraft. Downdraft kilns bee-hive shaped. Building at rear is top of updraft kiln. Plant making common brick in updrafts and face brick in bee-hives or downdrafts. Supplies many face bricks to builders in city of New York.

One manufacturer told the writer he required 15 inches settle in 38 layers. Another said he required a settle of 18 to 22 inches in 32 layers of bricks in his downdraft kilns. He said he had tried 12 and 13-inch settle but had not been able with that settle to get a certain size and color of brick on which he was building a reputation.

The above remark shows why we need not expect a uniformity in face brick sizes, as a good many brick makers are trying to put a distinctive brick on the market.

Clays Differ

The difference in clays out of which bricks are made also affects the size of the bricks. One manufacturer had an immense stock of bricks on hand which he had been unable to sell and when the writer saw them was then offering them much below the market price. Another manufacturer told the writer that this man with the surplus bricks had been unable to sell readily because his clay was of a character that gave a greater shrinkage than usual and had resulted in a brick slightly smaller than his competitors were making. Some make bricks from clay only, while others mix clay and shale in varying proportions, which fact further explains the differences in shrinking and consequent size.

No Uniformity in Faces

Just now the rough texture face brick is much in demand, and different manufacturers with some downdraft kilns are developing different faces on their bricks. They are doing this by a variation in the size and kind of wire used in the cutting. One manufacturer told the writer that he had a very pliable clay, but had experimented with a good many different kinds and sizes of wire before he had found just the wire that would give him the rough texture he considered most beautiful. Another kind of clay and shale would require another kind of wire. The principal point in this, to the brick buyer, is to make sure that when he is buying a face brick he can get enough from one plant to complete the job, as he would not be able to match his brick from another plant.

Some Colors Not Matchable

The colors of face bricks are often not matchable from other plants. The writer knows of one plant that is making a peculiar face brick from a rotten shale having in it particles of iron. It cannot be duplicated.

One board of education that was building a fine schoolhouse had to discard its first choice of face brick because it could not get enough to complete the job and could not match it elsewhere. It was only by a timely warning that it escaped starting with one kind of face brick and having to complete it with another, which would have ruined the appearance of the building.

It Pays to Advertise—

If You Can Deliver the Goods

MEMBERSHIP in a Master Builders' Association is a good form of advertisement for the builder, because it indicates that he can "deliver the goods."

Apropos of this statement read the following parable:

"A leopard once met a lion down by a water hole in the jungle, and said: 'Why do you go about the jungle roaring the way you do?'

"The lion said: 'I believe in advertising. If it had not been for my advertising, I would never have been made king of the beasts. It pays to advertise, and I never fail to grasp an opportunity to do it.'

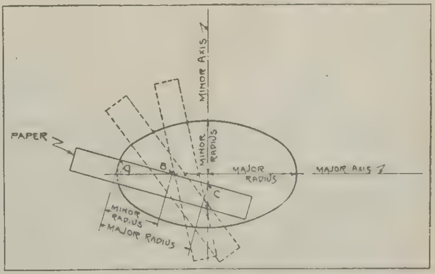
"It so happened that a rabbit who was crouching down in some weeds heard this conversation, and appreciated the logic of the thing.

"Next day, as he was nibbling at a big tree, he filled his lungs, threw back his head, and let out what was supposed to be a roar; it resulted in a high-pitched squeak. A fox happened to be on the other side of the tree, and hearing the squeak went around to investigate. Of course, he ate the rabbit."

Now, the moral of this parable is, It is folly to advertise—if you don't have the goods.

A Novel Way To Draw an Ellipse

LAY off on a piece of narrow paper the major radius, A-C, and the minor radius, A-B, as shown in the accompanying diagram. Move paper to several positions always keeping point B tangent with the major axis and point C tagent with the minor axis. Mark on the drawing at A a point for each position of the paper and connect these several points with a compass or irregular curve. If this method is followed carefully the result will be a true ellipse.



Will Some One Please Explain

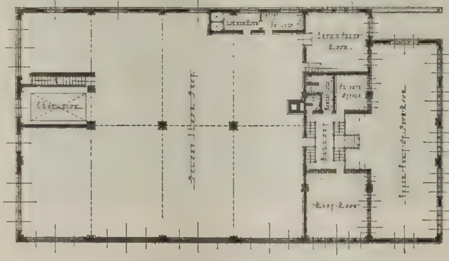
A New York specialty store advertises a "Building Expansion Sale for Stout Women." Further proof that the Fuller Construction Company is taking a hand in the design of women's wear.

Automobile Sales and Service Building

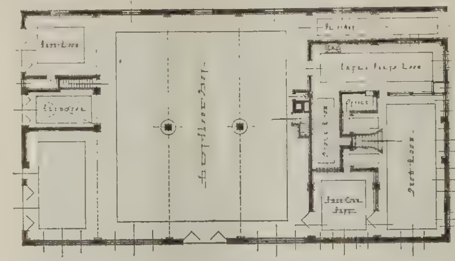
JOHNSON, MILLER AND MILLER, Architects

THE Nichols Auto Sales Building at Terra Haute, Ind., is a pleasing example of an attractive building of this type. The exterior is entirely of brick with stone sills, lintels and trim. The interior arrangement is such as is adapted to the automobile sales and service business. The entire front of the first floor is given over to a show-room with the exception of one corner for the storage of extra automobile parts. Entrance from the street is on either side of the building. The left hand entrance leads directly into the show-room and the right hand, into the storage room. Naturally, the whole front of the show-room is closed in with three bays of large plate glass windows. Opposite these windows is an impressive stairway leading to the second-floor balcony, and on the right of this stairway is the manager's office. Immediately behind the stairway is the stock room with an entrance from the extra-parts storage. On the left of the stairway is a door leading to the used car department which is on the left hand side of the building, back of the show-room.

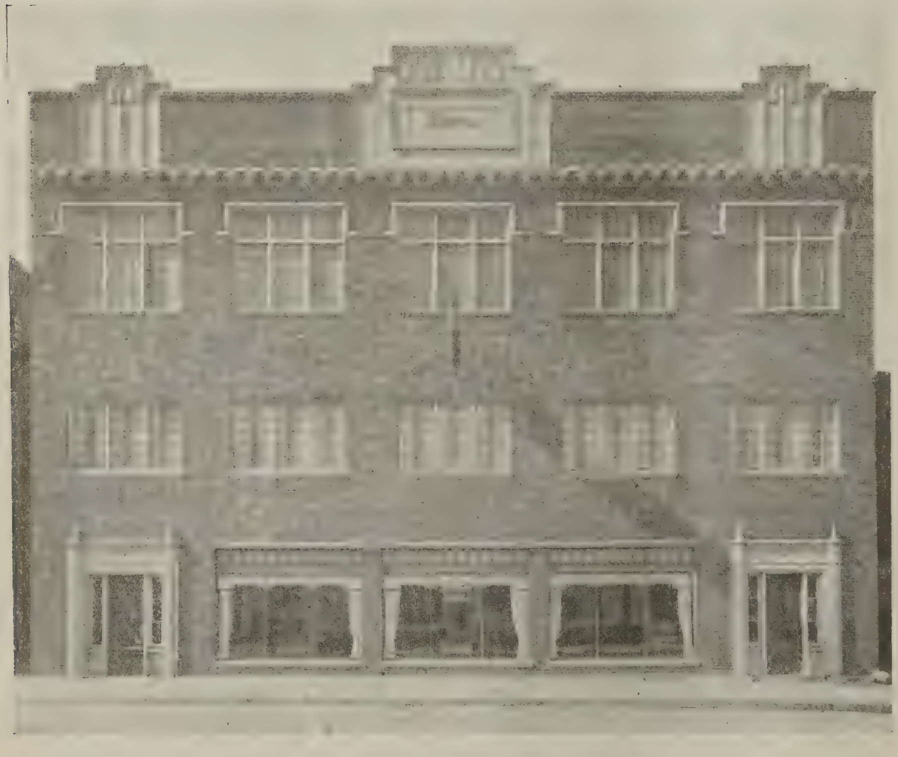
The second-floor balcony is given over to another extra-parts room, rest room and a small private office. The rear two-thirds of the building is taken up by a shop on both first and second floors, with an elevator connecting them at the rear and a small stairway at the front. A driveway from the front of the building leads directly into the first floor of the shop.



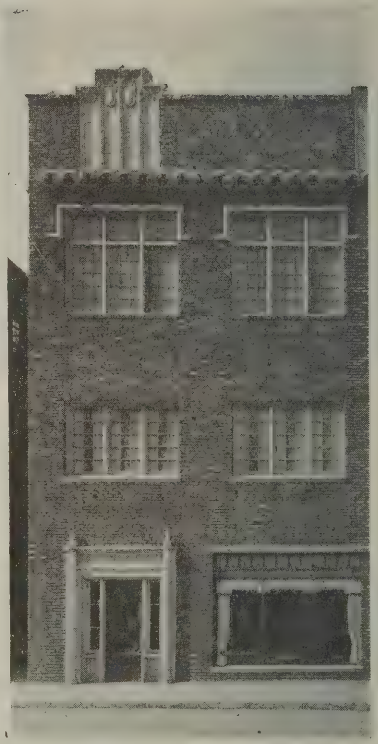
Second Floor Plan



First Floor Plan



Nichols Auto Sales Building, Terra Haute, Indiana



Suggestion for Apartment

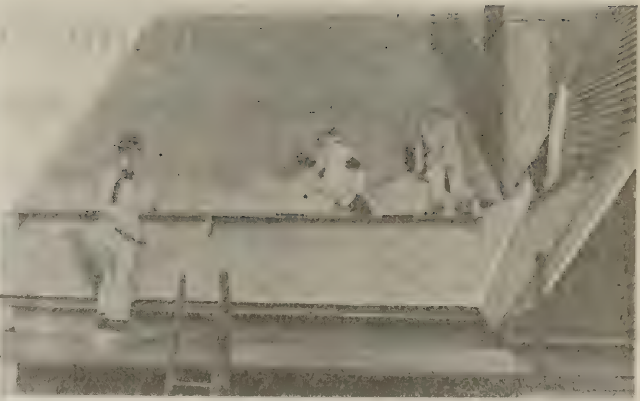
The exterior treatment of this building suggests many possibilities. It would look well as a small apartment house with the entrance located as shown and with stores where the present show-rooms is located. With a slightly different treatment of the parapet, the width of the building could be cut down to 4, 3, or even 2 bays, and serve as an excellent exterior treatment for a modern apartment, with some modifications.

Cleveland Building Show Coming!

A NATIONAL building exposition, conducted by the men of the construction industry on a non-profit basis, and purely for the purpose of stimulating building operations, will be held at Cleveland this Fall. Cleveland is the home of this type of business-producing building show. The first complete building shown was held in that city in 1916.

The exposition will be the first in Cleveland's new $5,000,000 Public Hall. This is said to be the largest exposition building in America, equipped in every way for a complete and successful show, with 70,000 sq. ft. of exhibition space.

An Asphalt Shingle Re-Roofing Job



Making an Old Roof New with Asbestos Shingles

Now Is a Good Time to Fix Up the Old Roof

Composition and Tile Roofing—How to Lay Them to Get Good Service and Pleasing Effect

AMONG the various sources of business in times like the present, one of the most important is the re-roofing job. To put on an entire new roof is an expensive job, but if the material is placed directly over the old roof there is no necessity for ripping off old shingles. This method is both cheaper and less messy, and also lends an added insulating value, due to the old roof.

The secret of using tile, shingles or roll roofing in this manner is to treat the old roof exactly as if it were a boarded surface, disregarding the shingle course entirely. If any old shingles are badly curled up, they had best be nailed down. Where shingles have fallen out they may be replaced with new ones, although this is not absolutely necessary.

Asphalt or asbestos shingles are widely used for these re-roofing jobs. For the valleys and ridges roll roofing of the same quality may be used (Fig. 1). Shingles may also be used on the ridge.

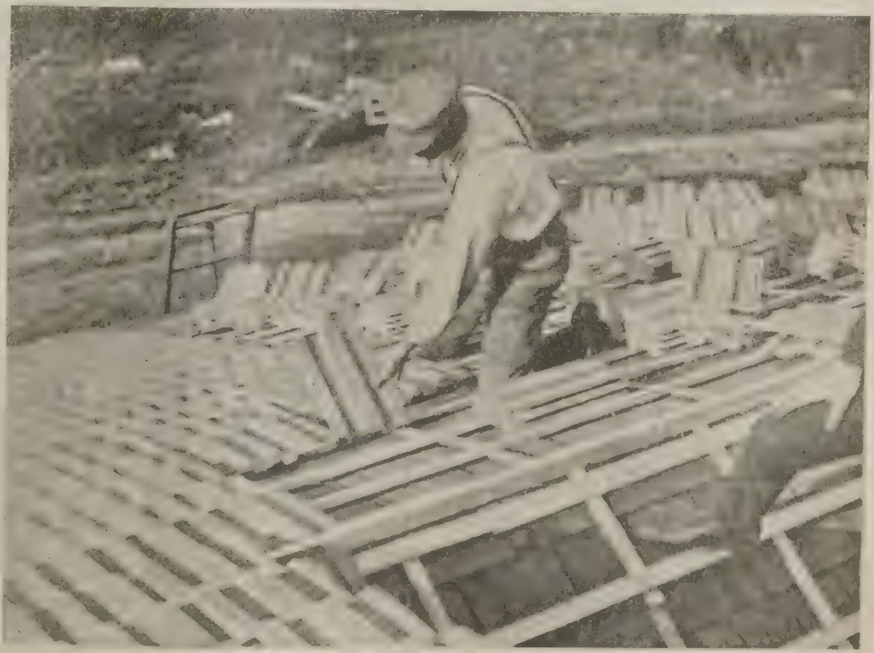
Strip shingles consist of asphalt shingles linked together so that, when laid, they have the appearance of separate shingles. They are much quicker to lay than separate shingles. A roll roofing pressed to look like shingles is also often used.

An interesting job of laying tile over an old roof is shown in one of the illustrations. Vertical strips are run from eaves to ridge and crossed strips are nailed to these about twelve inches apart. The tiles are hooked over these 1x2 crossed strips, beginning at the eaves and working up. The horizontal joints are cemented up to make the roof tight against a driving rain, but the vertical joint of the tile is so constructed that no pointing is necessary.

Roll roofing is always cheaper than shingle and, therefore, lends itself to use on barn buildings and the cheaper class of structures. It comes either with a slate or plain surface and may be laid vertically from the ridge to the eaves or horizontal, laid parallel with the ridge.

Where the roof is in very bad shape, it is possible to nail lath vertically from ridge to eaves and fill in between with lath where the joints come. This gives a firm, even surface for the joint. Even this may be dispensed with by locating the shingle lath and nailing through to it. The

(Continued on page 32)



Laying a Tile Roof Over the Old Shingles

Loaning Money on Long Term Lease

How Builders in Vicinity New York Are Borrowing Needed Capital

THE increase during the last few months of the disposal of valuable parcels of both improved and unimproved real estate on long term leaseholds has aroused new interest in the question of loans on such properties. It is held by many real estate men that a long term leasehold, properly executed, covering well-located land, rented on a reasonable valuation and to responsible parties, should be considered favorably for loaning purposes.

Some banking institutions adhere to the age-old practice of loaning only on property which is owned in fee simple by a borrower, considering a lease as not representing sufficient equity in land to make it worthy of consideration, says Stanley L. McMichael in "Long Term Leaseholds."

"Keen bankers in the larger cities where leasing is practiced generally have come to a realization, however, that when certain conditions are carefully observed, a lease is of sufficient security to loan money on for the erection of a building. As a matter of fact, the loan is made on the building only, comparatively little attention being paid to the lessee's equity in the leasehold itself, unless the lessee may have a very valuable equity in his lease."

"Take a typical leasing operation and analyze it carefully: The land, it may be assumed, has a valuation of $25,000, on which an annual rental of $1,500 is being paid. The lessee is bonded to erect a building and decides that a structure costing about $25,000 is advisable to make the best earnings possible for the property. The lessee makes application to his banker for the loan.

"The first thing the well-informed banker does is to have an appraisal made of the land to determine that the rental being paid is justified and fair to the lessee. An analysis as to location, anticipated growth in value and other conditions is secured and the banker, satisfied that the lease is a fair one to the lessee, who wishes to borrow, agrees to loan $12,500, or 50 per cent. of the value of the building.

"The lessee must advance the other $12,500 in cash to complete the structure. The banker will usually require that the lessee's money be on deposit before the loan is made, the proceeds of the loan to be applied last on payments for the improvement.

"Many building clauses are not fulfilled until a period just before the time expires for them to be executed. This is usually within five or sometimes ten years of the time the original lease was made.

"If the property has advanced in value and the land is held under a 'straight' or 'flat' lease, the lessee doubtless has added equity due to the land's enhancement in value. If it is a graded lease the added value may be partially absorbed by the going into effect of a higher rental for the second five-year or ten-year period.

"Some security houses which issue building bonds on leaseholds will loan as high as 60 per cent. of the building, if it is to be placed on well-located land concerning which there is little doubt as to steady increase in value and where the initial earnings promise to be exceptionally good.

"In making a loan on a leasehold the institution advancing the money usually insists that a mortgage or trust instrument be drawn, providing against all conceivable contingencies.

"It may require that the main long term lease and all shorter sub-leases be assigned by means of the trust deed to a trustee who will act throughout the life of the loan. Some bankers prefer that all sub-leases, particularly the important ones, extend for the full term of the loan, thus insuring additional security.

"Another provision which a cautious banker will sometimes insist upon is that each month there shall be deposited with the trustee an amount equal to the rental due, in addition to covering all taxes, insurance and sinking fund requirements.

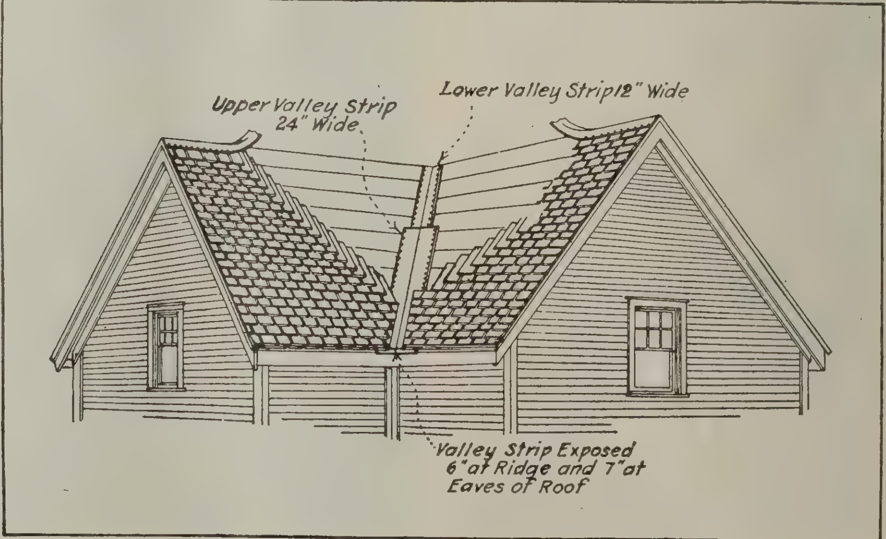
"The trustee is required to assume the duty of meeting these obligations regularly out of the sums advanced monthly, thus carefully supervising the entire transaction to see that none of the provisions of the original lease are violated or transgressed. The

(Continued on page 33)

Now Is Good Time to Fix Old Roof

(Continued from page 31)

laps are then made according to the spacing of the lath. This method, however, is apt to be wasteful of material. Perhaps the best method of finishing roll roofing along the sides is to turn it down along the edges and finish with a molding.


Upper Valley Strip 24" Wide.
Lower Valley Strip 12" Wide
Valley Strip Exposed 6" at Ridge and 7" at Eaves of Roof

RIGHT:

Roll Roofing of the Same Quality as the Shingles is Often Used for Valleys and Ridges.

Beating Building Costs in Birmingham

Alabama Building and Realty Company Solves Housing Problem and Laughs at High Cost of Homes

By **M. T. HOLDER**

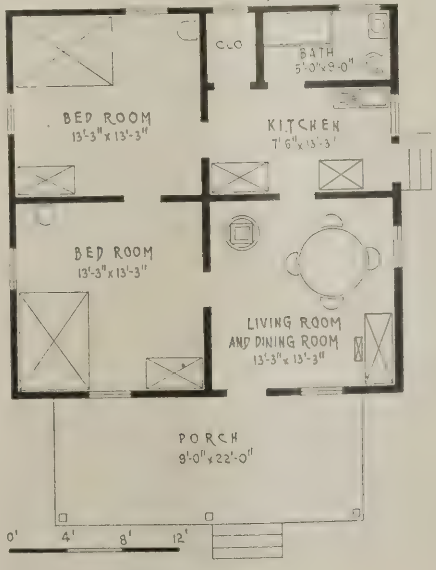
THE recent shortage of houses, caused by the cessation of building during the war, coupled with the high prices of building materials still existing today, has been a great problem confronting the people everywhere. But despite the greater costs and the extra burden the present unsettled conditions have placed upon us, we must build. As a practical home-building investment, the economical idea of the "simplicity home," recently originated in Birmingham, Alabama, eliminates waste of money and expensive design, and at the same time encourages the building of more houses.

A lot in one of the best residence sections may be purchased from the realty company who conceived the idea of the "simplicity house," these lots, of course, varying in price according to location. An attractive house, the keynote of which is simplicity combined with convenience, is then erected on the rear of this lot by the realty company, which charges each purchaser of a lot a standard price to erect the home. If the purchaser is unable to pay all cash for the lot and erection of his home, an initial cash payment may be made and the balance paid in monthly installments according to the cost of the lot. Thus, the total payment per month on the house and lot, including interest, taxes, and insurance, amounts to less than the prevailing rent for a house of like size in an equally desirable locality. While the house is built along the most practical and logical lines, and the owner may use his own discretion as to finish and other detail matters, yet the simplicity idea must be carried out and the plans, which are furnished by the company's architect, used. In this way, many architectural styles entirely too impractical for house construction are eluded.

The owner may occupy this house until the high costs of building materials, etc., shall have been reduced and the present unsettled housing conditions are passed, or until such time as he will be able to build a larger or handsomer home on the front of the lot. Then, if desired, the little "simplicity house"—by the removal of one partition—may be converted into servants' quarters and garage.

A contract stipulates that the realty company must have the right to approve the plans for the house that is ultimately to be erected on the front of the lot. This is required as a protection to the other property owners in the vicinity, and to offset the possibility of the erection of homes by those who unknowingly choose architectural designs devoid of grace and beauty as well as the maximum of efficiency.

Temporary Simplicity Home Built in Residential Section of Birmingham, Alabama.



Floor Plan

Nothing contributes as much to peace and contentment as homes. The owning of a home creates simple living and thrift, and is a strong combatant to extravagance. Thus, the building of these little homes answers the call of "back to the simple life," and in these days of maid-shortage, as well as house-shortage, and for those not blessed with too generous incomes, the "simplicity home" is fast solving the problem.

Money for Building on Long Term Lease

(*Continued from page 32*)

trustee thus knows that default is impossible and that the loan is amply secured.

"The banker will doubtless insist that the loan shall be reduced serially so that each year the amount remaining to be paid shall be steadily lessened, thus guarding against unexpected depreciation. He will also require in his trust instrument that the trustee shall have the right to take over and operate the property in the event the lessee in any way defaults, thus acting as a receiver on behalf of the bank to conserve its security."

How To Estimate Driveways, Terraces and Seeding

Figuring Extras on Grading Jobs From Plot Diagram—Question of Sod or Seed Depends on Local Conditions

By **LAWRENCE S. KEIR**

THE cost of drives and other extras in connection with grading depends on the contractor doing the job and the cost of materials and labor in the vicinity. The purpose of this article is merely to show how the quantities and other items forming the basis of an estimate can be arrived at. In this respect it is similar to the article on "Method of Estimating Excavation and Finished Grading," which appeared in June BUILDING AGE.

The reader will do well to refer to that article while reading the present discussion because any points passed over hastily here are explained there and vice versa.

Where a driveway is included in the grading its area is not deducted from the grading required on the rest of the premises unless the job is a very small one. In most cases working around the driveway would more than counteract any saving in the material moved. Drives, walks, flower beds, etc., are extras and are figured separately.

For a good drive, at least eight inches of top soil should be removed and replaced by road material. The amount of material to be carted away and replaced is figured as described in June BUILDING AGE under "Method of Estimating Excavation and Finished Grading." Allowing the labor of one man to level off the road material as it is hauled in, a close estimate of the cost of the drive can be arrived at.

Road building material is figured and bought by the cubic yard. Possibly the top soil can be used on the premises or sold to some one in need of it.

A cheap road can be made by plowing a few furrows each side of the road. Pull the sod to the middle of the road-way with hooks, then round the road-bed up by the use of a light road scraper. A team of horses and five men can build about 300 yards of such road in a day, the road being about 12 feet wide.

Walks of any kind will cost more in proportion than drives.

A topping of crushed stone, gravel or course cinders will improve the road. Such material is usually charged for by the cubic yard, delivered.

Frequently a plan like the lot plan at Fig. 1 with elevation lines but no section drawings, will be all that the contractor has to figure the grading from. However, sections can easily be developed from such a plan. Suppose the lot is to be graded level with the 94′ elevation line on the plan and it is desired to have a section through the center of the plan.

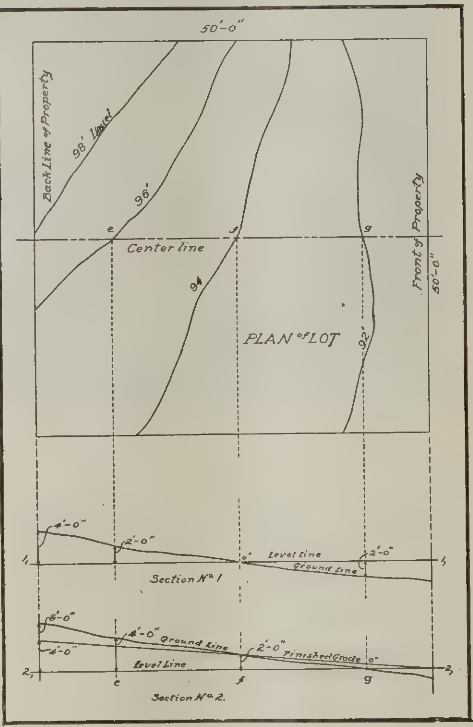


Fig. 1. Plan and Section of Lot

Draw the line *A, B,* through the center of the lot plan. Below the plan, draw the level line 1, 1, as shown in section No. 1. Drop lines *e, e, f, f, and g, g,* from the points where the elevation lines on the plan cross the center line of the lot. The line *f, f,* will mark the zero or starting point on the level line of the section drawing. Measure up 2″ by scale from the level line where the *e, e,* crosses it. Measure up 4′ on the line representing the back line of the property. Measure down 2′ where the line *g, g,* crosses the level line. A line drawn through the points thus found will give a cross section through the center of the property.

Section No. 2, represents another problem. There it is desired to have the finished grade level with the 92′ elevation line at the front of the property and with a rise of 4′ at the back of the property. Start by drawing the level line 2, 2. Where we drop the line *g, g,* across the line 2, 2, will be the zero point. Where *f, f,* crosses, measure up 2′. At *e, e,* measure up 4′ and measure up 6′ on the line representing the back of the property. A line drawn through the points found gives the outline of the section. Now on the back property line of the section drawing, measure up 4′ from the level line and from this point to where the level line crosses the front property line, draw the finished grade line. By measuring from the finished grade line to the ground level, the depth of fill and amount of material to be removed can be found.

These measurements are best taken at set distances apart. Also the more cross sections developed the more accurately the work can be estimated. In a plan of this kind, the elevation lines marked 92′, 94′, 96′, 98′ would indicate that those lines were that distance above sea level or that they were that distance above some set point established as a leveling point for property in that section and called a bench line.

Figure 2, represents a method of developing a cross section drawing of a side hill that is to be graded into several terraces. Draw *a, a,* by scale, to represent the level distance from top, of top terrace to bottom, of bottom terrace. Draw *a, b,* to represent the height from bottom of bottom terrace to top of top terrace. Divide *a, b,* into same number of spaces that there are to be terrace slopes, by drawing the lines, 1, 1, 2, 2, 3, 3, 4, 4. From *b,* draw *b, c,* "which is the slope of the top terrace" at the same angle it is to be finished to. Drop a line from *c*, to *d*, and divide the distance *c*, to *d*, into one less space than there are terraces, by drawing the lines 5, 5, 6, 6, and 7, 7. At point 7 on the line 4, 4, point 6 on line 3, 3, etc., will be the points from which the remainder of the terrace slopes can be drawn as shown. A line drawn from *b* to *a*, will be the average of the finished grading. If the slope were finished off to the average grade line, there would be the right amount of earth on the premises to build the terraces, for what was removed from the portions below the line would fill the portions above the line. For instance, dirt from *A*, would make the fill at *B*, dirt from *C*, would make the fill at D, etc. The unfinished outline of the side hill is represented by the dotted line. By figuring the area of I and deducting it from the area II, will give the amount of earth in this case to be removed from the premises.

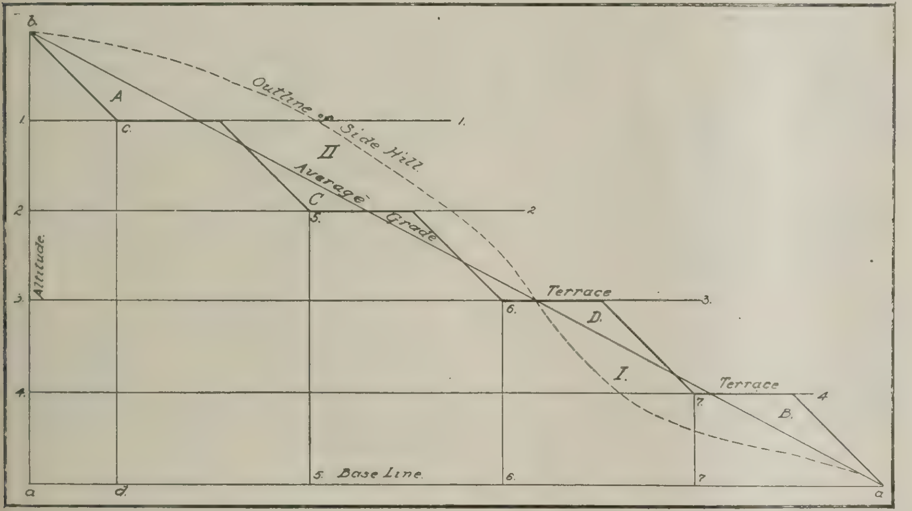


Fig. 2. Method of Developing Cross-Section of Side Hill

The rough excavating for terraces will cost about the same as cellar excavating while the final finishing off will cost about twice what would be required for level ground. More time too, must be allowed for establishing lines on terraces.

Seeding new lawns requires 4½ to 5 bushel of lawn grass seed.

Unless the ground is in excellent condition about 20 loads of manure and 300 pounds acid phosphate per acre will be needed, or if manure can not be had, one ton of commercial fertilizer may be used.

Following is an estimate for seeding one acre of lawn, assuming that the ground is already plowed and harrowed:

5 bu. lawn seed @ $7.00	$35.00
20 loads manure delivered and spread @ $5.00	100.00
300 lbs. acid phosphate @ $2.00 per bag	6.00
Sowing seed and phosphate and raking it in (2 men—2 days)	16.00
Rolling the ground, man & team (½ day @ $8.00 per day.	4.00
Total cost	$161.00

A good commercial fertilizer could be had for about $60 per ton which would be $40 cheaper in first cost than the manure. However, the saving of the acid phosphate would be about used up by the added labor of distributing the ton of fertilizer, but the manure puts the soil in better condition and is more permanent.

One acre contains 160 square rods or 4,840 square yards

	Square yards
A lot 150′ x 100′ as in Fig. 1 =	1,666
Cellar 40′ x 30′ =	133
Balance	1,533

$$\frac{1{,}533}{4{,}840} = \text{a little over } 1/3 \text{ and}$$

1/3 of $161.00 = $53.67—the cost of seeding the lot. If the ground was stony, there would be the added expense of raking up and picking off stone. To set a fair price for this work would be impossible without first seeing the grounds. Only actual experience will be of any use here because stones vary so in size and quantity. Some pieces of ground can be cleaned off in a few hours; on other pieces the stones appear to be endless.

With soils that wash badly, especially if there are terraces, sodding will be needed. Then, too, some people do not wish to wait for grass to grow and are willing to pay the extra expense of sodding in order to have a green lawn right away. Sod can, in many places, be had at so much per square yard, laid. The price varies from 8 cents to 20 cents per square yard, depending on locality, lay of ground, quantity, etc. Here, in my own section, sod could hardly be had at any price, as farmers are the only ones who have it and they would figure the loss in fertility as more than the price received for the sod. Also, field sod, would hardly make a good lawn. All told, it would be risky to put in a bid on a job where much sod was called for until an agreement was made with someone to furnish the sod at a given price in case the contract should be landed.

His Heart for a House

RICHARD THE THIRD offered his kingdom for a horse, but in Rome a man recently offered his heart for a house. The housing situation in that city has been so acute that one of the "roofless ones," as they are called, inserted a personal advertisement in a newspaper stating in graceful and inviting terms that he would marry any spinster or widow who possessed a house of her own. The advertiser added that he was a man of considerable means.

Another phase of the general housing crisis is the studio shortage, and an effort is being made by the commune of Rome to allot to various artists some of the towers and turrets that can be made habitable in the ancient city walls. Fitted with comfortable furniture and electric light, many of these old towers will provide large and picturesque studios for a number of painters.

In the tower of Belisarius, the "master of the walls," Signor Francesco Randone, has organized a school of educative art for children.

Some of the new studios will have the disadvantage of being a little distant from the center of the city, but will have fine views as compensation.

—*Top Notch Magazine.*

How France Is Building New and Better Low-Cost Houses

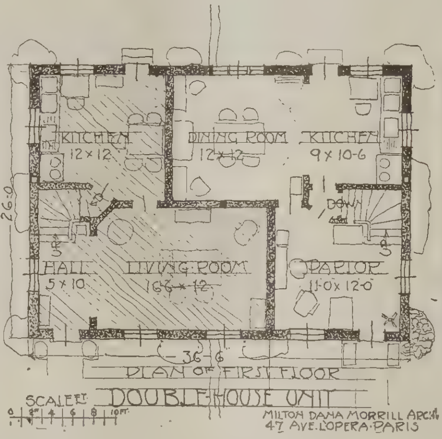
Letter From an American Architect in France to Fellow Readers of Building Age

By **MILTON DANA MORRILL, Architect**

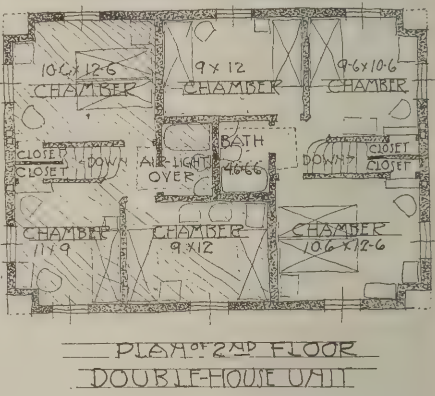
As the French Government has been so generous as to ask me to come to France and as I have found many valuable and interesting building methods and details here, which are not generally known to us in America, it seems to be "up to me" to pass along to you a few of the good points which the French have given to me.

I came over last November under the plan of the French Restoration Fund to study conditions in the war-devastated regions and to see if my method of moulding concrete buildings could be used to help out in the biggest house building job which any country has ever had to face. The whole Winter was passed among the ruined towns and villages of Northern France. Many of the ruined towns remain today almost as they were left by the Germans. The first work was to get the fields back to producing crops. Temporary wooden barracks have been put up by the Government for shelter.

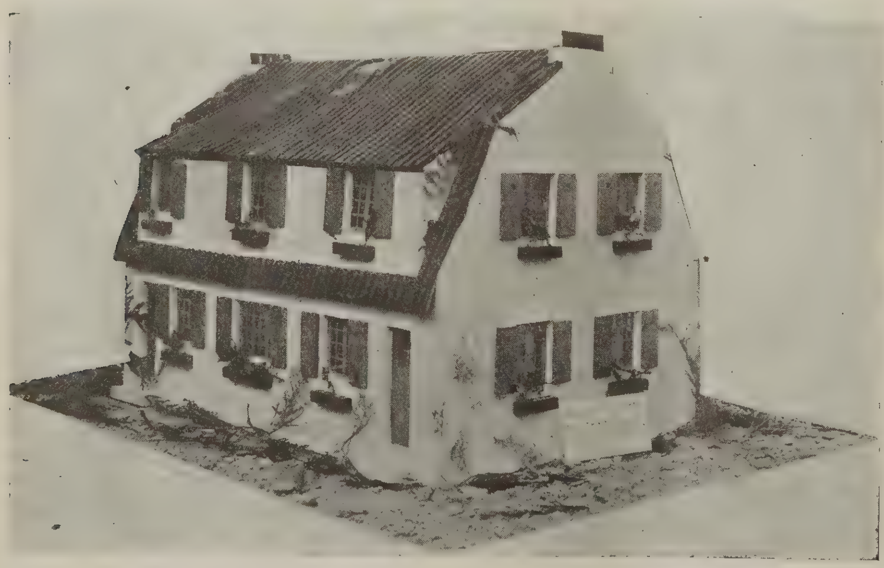
It was imperative to get the families, or what remained of them, back on the land before they became located and fixed elsewhere. No time or money has been available for permanent building. Now that there is some prospect of the Germans being made to pay for what they have done, the building of permanent houses of masonry will be started. It is in connection with this work that Mr. R. J. Caldwell of New York gave to France a set of my house moulding steel forms and asked me to come over to demonstrate and to study how, if at all, my building system could be made to serve in the gigantic task ahead. Like most of us I felt that America owes to France a great debt for fighting our battles for us and naturally was glad to have some chance to help. The least that I could do was to offer to give time and service when the French Government offered to pay *voyage* and *sejour* while here. It has now been seven months since we landed, and there have been many delays. A young pattern maker helped me on demonstration work and is now writing my French letters on the typewriter and helping in many ways. He speaks no English, so I have had to learn some French.



Plan of first floor "L-shaped Air-Light" Houses. This plan combines both French and American ideas in order to produce modern houses at low cost. This plan, which can be carried out as double houses or terrace groups of four or more, has been accepted for building by the city of Tourcoing, North of France



Plan of second floor. Note the compact arrangement of the rooms, no waste space. The "Air-Light" over the hall and bath is taken from the standard practice in Philadelphia. While this low cost house has been worked out for reconstruction in France the design is equally adaptable for houses in America.



Model of L-shaped Air-Light two-family cottage to be built at Tourcoing, in the midst of the devastated area of Northern France.

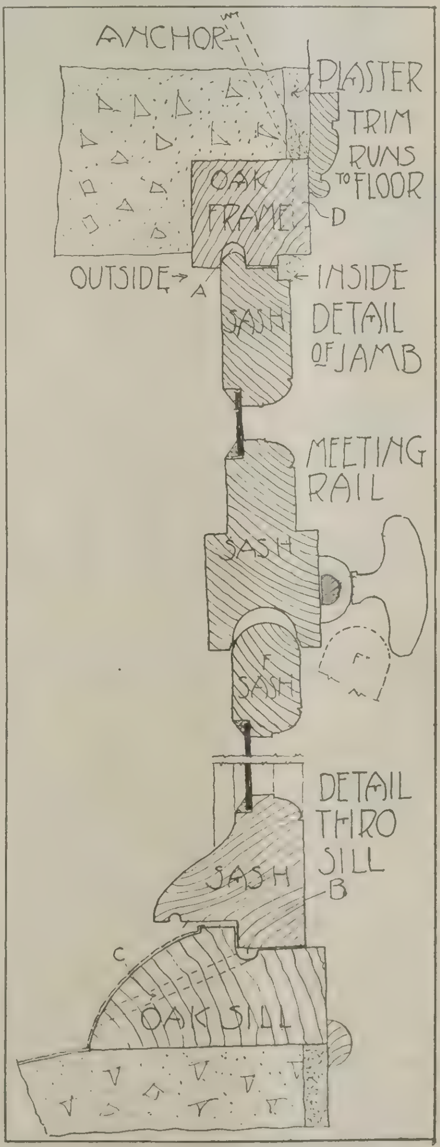
The Dutch gable is used much in this section of France.

The walls are white stucco finish. The roof is red tile. The window sash and shutters a Paris green. This model house together with the house moulds were awarded the Grand Prix in the General Exposition, Paris, April, 1921, Section "Houses built at low cost."

After looking over the ground in the devastated area it appeared that a grout-concrete utilizing the broken bricks and stones of the destroyed houses would be the most useful construction to follow, as by this means, we could erect the masonry houses while clearing the ground of debris. I estimated that we could thus gain an economy of 30% at least over brick and stone masonry. In order to test this out the Municipal Architect of Tourcoing (adjoining Lille) had a house wall built. To each part of cement we added ¼ part of hydraulic lime and six parts of crushed cinders. As this mortar was dumped into the steel forms we fed in all of the odd shaped stones and bricks that we could bed in to the mortar. As soon as the forms were filled we tapped the sides of the steel plates lightly as we went along. This vibration filled all voids without tamping. We got a fine straight and smooth wall, as strong as a brick wall, and our costs showed a saving of 40% over brick masonry—to cut a long story shorter, I was encouraged by the results to enter our American system in a competition for low cost building methods held by the City of Paris and the jury were kind enough to award the system the second prize of 1,500 francs and in the general Exposition which followed. The exhibit of our model houses and building system was given the gold medal or the Grand Prix as they call it here. The next move is to build some demonstration houses but someone has to foot the bills. It will be necessary to find private interests to do this as the Government will in time pay the war damage but will not itself enter the field of building permanent houses. For each town or village a cooperative is formed, the citizens pool their interests, that is they pass over their allowed claims for damages to the cooperative. In this way the cooperative can issue bonds against the damage claims of the community and can start work on rebuilding before the actual money comes from German payments.

Building Material Bought Wholesale

The cooperatives can also buy building materials at wholesale and have the work done on several houses by one contractor and thus a saving for overhead and other economies can be made. It has been proposed to build our first demonstration houses at Tourcoing near Lille, in the heart of the devastated regions. You will see from the plans that I have designed a double house which can be carried out in groups of two, four or any even number in a row. You will note that the party wall is offset so that the houses interlock in plan. This L-shaped plan works out for economy in space as halls and passages are thus reduced to a minimum. You will note that the bath rooms which are looked upon as luxuries here in France are so located that one set of piping serves for both houses. The proof of the pudding is in the eating but I figure that by the combination of our American and French ideas this plan will give us a good roomy house for a large family and at the same time a cheap house to build notwithstanding the luxury of the bath room. From the section you will see that I have taken the "air-light" method, the Philadelphia standard, for lighting and ventilating the halls and bath rooms.



The French casement windows do not leak. Any water that may get by drains down the groove A; this connects with a graded groove B in the sill and drains out the hole C. The frames and sash are usually of oak.. The corners of the sash are reinforced by wrought iron angles let in flush on the inside face.

There is no projecting wood frame, when open there is more than twice the air which we can get with our sliding windows.

The frames come on the job after the rough work is done. They are fitted with sash and hardware complete in the shop. The glazing is done on the job, the frames are fixed in place by wrought iron anchors let in to the masonry.

When closing, the sash interlock and jam themselves tight. The interlocking joint as well as the projecting tongue in the jamb keeps the sash straight. The sash are fastened closed by a cremone bolt operating top and bottom in a keeper. For slight ventilation the sash F occupies the position F and and is held in place by the handle of the cremone bolt.

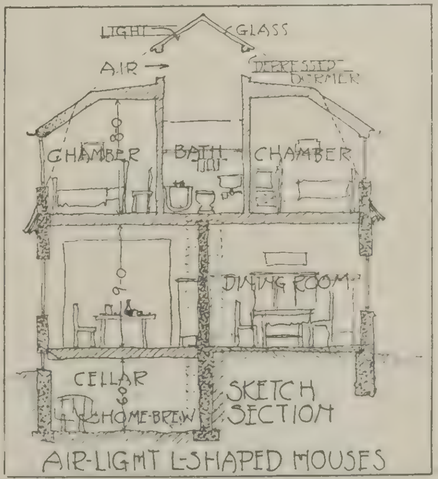
In some cases I find that the wood and masonry sill is covered by zinc with the edge rolled to form a drip outside. In France z.nc is used instead of tin or galvanized iron and lead pipe instead of galvanized iron pipe. The first cost is a little more, but they last longer and the old material can be salvaged.

The city requirements in the north of France call for high ceilings almost 10 feet in the first story. This gave some difficulty in designing the houses for a good exterior appearance as generally a long low house looks better than a high narrow one. In this part of France there are many houses with the gambrel or Dutch roofs as we call them in America. By using this type the general style of the charming old French cottages can be carried into our work and we can get away from the high and stilted look.

The charm of the old French cottage also lays in the fact that there were no dormer windows to cut up the roof lines of the house. We had to have a good sized hinged window in the roof to give proper ventilation for the halls and bath rooms, so instead of a projecting dormer we make a recessed dormer which costs less and looks better.

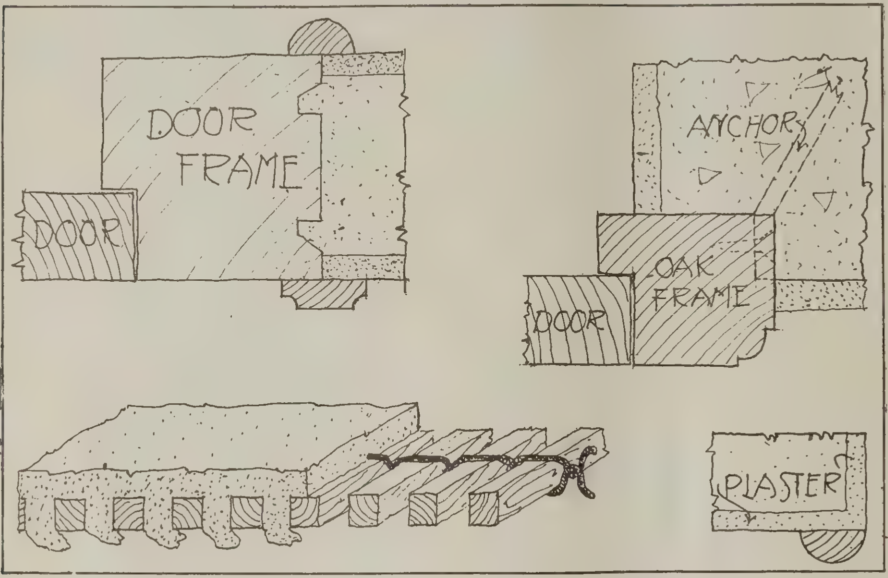
In America we would call this a design for a double cottage of two stories but here in France this is called a one-story house. The entrance story of *rez de chaussee* is not counted when you speak of the number of stories.

There is very little building going on here in France, present costs are three times the pre-war figures but even then with the exchange at 12 francs to the dollar, costs here are approximately one-half of similar costs in America. A complete casement window, which is the only kind used here, costs with unglazed sash fitted in frame and cramon bolt hardware only $7.08 in soft wood. Generally the grade of material here is



SKETCH SECTION. Showing the "depressed" dormer and "Air-Light" feature ventilating halls and baths.

The keg shown in the cellar, in France can contain the "real stuff," in America only "home-brew."



Detail of the inside-door jambs used in France. One jamb piece extends from floor to ceiling. The finished jambs are used as grounds for plastering. The city of Paris is now building 100 houses in which the plaster blocks are laid up on one side to line, joints are filled, but no plaster coat applied, to be finished with paper or paint

Inside door frame of oak. I have seen very few mortice locks in France. All the locks are exposed screwed on. It will be noted that with this door frame no trim is needed

Detail of Roll-Lath used in France, square wood strips ½″ x ½″ scant by 40 inches long are wired together. This comes in rolls. It is used for ceilings. It is better than our wood lath used in the U. S. All partitions in French houses are solid, of brick or plaster block

Half-rounds are used extensively in inside finish. It makes a neat corner bead

not as good as with us in America but the workmanship here is better. Wood finish is much lighter in thickness, for example base boards are four inches wide and half an inch in thickness, door trim is made by a moulding two inches wide by five-eighths of an inch in thickness. We in America will have to "go some" if we beat out the Frenchman in the economy of material. During the war I designed the interior finish for seventy-five concrete houses which we built for the munition workers of the General Chemical Company at Claymont, Del. I worked out a door frame detail doing away with the use of temporary grounds. When the studding was set up we set in the finished door frame and plastered to the finished frame. We also set the wood base and plastered to that; after the plastering was all finished we run a cover strip one-half by two along the top of the flush base and returned this strip around the door frames to form a trim. I thought that I had found something new but when I got over here I found that the French carpenters had been doing the same trick for years. At Lyon it is reported that the usual building method is to mould walls of cinder concrete, using two tiers of plank as forms and after the forms are filled the bottom planks are raised on top and filled again and so course after course the wall is moulded. The only difference between this and my method is that my forms are steel instead of wood and that the two tiers are hinged together for ease in handling but the construction principle is not new.

The Romans two thousand years ago used masses of grout-concrete with stones and bricks of all shapes and sizes, exactly the same material and used in the same way as we have built our house walks at Tourcoing during the last winter. The only difference is that the Romans poured their grout-concrete in mass between stone facing blocks making thick, heavy walls and we mould our walls between steel forms and so reduce the thickness to six or eight inches and add reinforcing steel rods where necessary.

Somewhat contrary to the general opinion I find that the French are keen and anxious for new and cheaper building methods. If you come to France to help you will get a hearty handshake and any busy engineer or contractor will give an American ample time and consideration to show what he has to offer.

Title Guarantee and Trust Company Aids Housing in New York

DURING the past two weeks the Title Guarantee and Trust Company has accepted building loans in Queens Borough to the amount of $650,000 for the accommodation of over 212 families, to be built by sixty builders.

This action is in accord with an agreement reached at a conference of financiers called by President Clarence H. Kelsey of the Title Guarantee and Trust Company to see what could be done to help builders who were unable to secure funds. As a result of this conference pledges of from $100,000 to $500,000 each, aggregating $2,900,000, were made in behalf of many institutions.

Officials of the companies participating in the project hope that the action taken by the group will be followed by similar groups of other leading institutions, and that the ultimate relief thus provided will be very substantial.

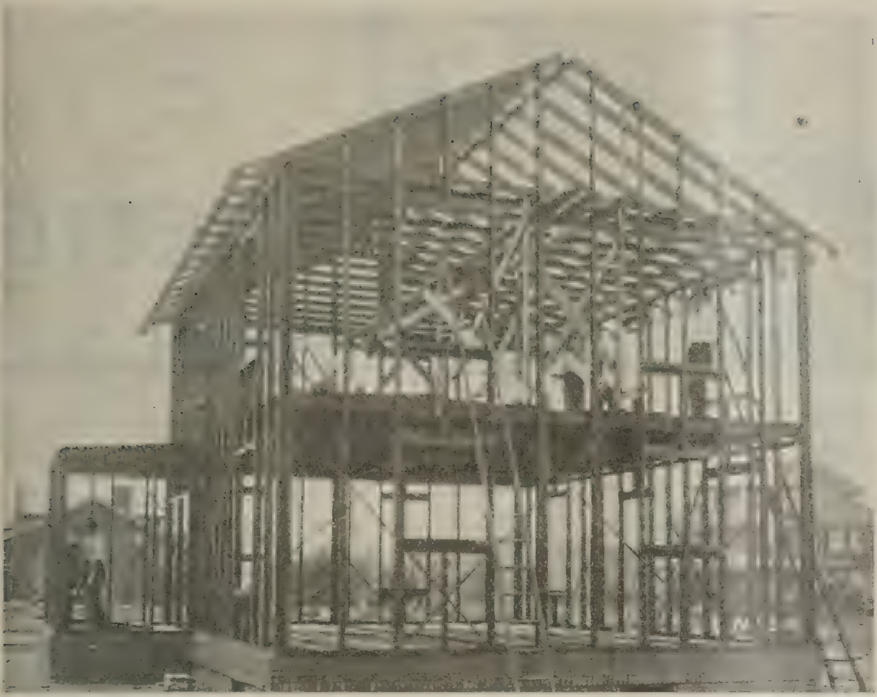
They also believe that a moderate amount of mortgage money provided in this way will give confidence to builders and home owners by convincing them that it is not impossible to get money for building operations.

President Kelsey said that the institutions represented in the matter had recognized the importance of aiding the situation which is causing so much concern. Many of them had no facilities for handling building loans on these small homes, but were confident that if this part of the work was done for them they would furnish the money.

"These loans average around $5,000 to $6,000 each and are the safest class of loans that can be made, and we hope that many other institutions will be able to aid the housing situation.

Announcing the $650,000 in loans Frank Bailey, vice-president of the Title Guarantee & Trust Company, said: "The housing sit

"I am sure the housing shortage will be decreased by spring to a normal basis.



Metal Framework of Canton, Ohio, House

Small House Built with Standardized Metal Lumber

THE illustration shows a house in Canton, Ohio, where metal lumber is being used entirely in the framing. Each joist, stud and channel was supplied in the exact size required. Spikes and nails were replaced by 3/8" x 7-16" bolts. The method of construction is as follows:

The framing of the outer walls is of four-inch channel shapes, on the inner and outer flanges of which are prongs, punched for the attachment of metal lath. Partitions are erected of two or four inch studs on both sides of which metal lath is affixed. Plaster is then applied as in homes of wood construction.

Floor Construction

The floors are constructed by using metal joists, spaced by two feet. Strips are nailed to these joists and wood or composition floors may be installed as in any conventional construction building.

Metal lath goes quickly into place on the bottoms of these joists to provide ceilings. Metal lumber rafters support the roof to which nailing strips are attached. Any form of roofing desired may be applied. Wood grounds are applied for the installation of windows, door frames, baseboards, picture molding, etc. In the finished house no metal can be seen, inside or out.

An exterior finish of stucco is used. It is pointed out that in a building of such firm framework this stucco will be permanently free from cracks, sometimes caused by settling or "weaving." Plaster and interior finishes will also be preserved.

The steel structure is imbeded in the foundations at all points and is thus anchored securely. The foundations may be on any standard type.

How Untermeyer Would Prevent Criminal Control of Building Prices

IN adjourning the Lockwood Committee for the Summer, which has been investigating alleged criminal practice on the part of contractors, labor, and material men in New York City and Buffalo, Samuel Untermyer, chief counsel, made the following constructive proposals: Competitors to be permitted to become members of trade associations, but only under rigid Federal supervision, and any one in an organization not so supervised or sanctioned to be subject to rigid criminal prosecution.

The amendment of the Federal and State laws so that the courts should be compelled to impose prison sentences in cases of convictions and should not have the power to suspend sentences.

The limitation of investments of financial institutions holding the people's money and provision for the compulsory investment on real estate bond and mortgage of a certain proportion of the entire investment.

The repeal of the usury laws as to all loans on real estate mortgages of $10.000 and upward. Usury laws with respect to large real estate mortgage transactions have become obsolete, and, however unwillingly, "we must recognize that money is a commodity and goes to the highest bidder."

Legislation to remove the monopolistic control of the fire insurance situation from the stock fire insurance exchanges, permitting competition between maximum and minimum rates, taking away from the companies the privilege of investing in all sorts of "wildcat" stocks and requiring the income from unearned premiums to be held as a trust fund to be applied to the reduction of rates instead of being paid over to the stockholders as at present.

Amendment of the present laws relating to city contracts so that whenever a contractor defaults on a construction contract with the city, the latter shall have the option of adopting all existing sub-contracts instead of being required to reject them all, and to readvertise for bids.

Amendment of the Penal Code so as to give the people the same right of appeal in criminal cases as that now possessed by the defendants, except that the people shall only have the right of appeal on questions of law.

Mr. Untermyer said, in discussing these proposals, that "these conspiracies would never have grown to their present dimensions but for the fact that in the rare cases in which convictions have been secured there has been a travesty of justice in most of the cases, before this committee began its proceedings by releasing the defendants on payments of fines. This has served as an incitement to further crime of the same sort.

Legal Department

How Can Repair and Tax Bill Be Collected?

HOW can one holding a mortgage for $700 on an old hillside cottage of a deceased aunt get her money back, together with money spent for taxes and repairs on the place. Foreclosure proceedings would bring $700 only. The value of the property is $1,000. There is only one direct heir living, a child three years old. A relative is living in the cottage. Can we get interest on the money paid as taxes and for repairs? There was no will or administrator.—A. O'L., Pittsburgh, Pa.

The mortgage should be examined for any provisions it may contain bearing on these questions. It is quite likely that it will be found to contain a clause to the effect that the mortgagor's failure to pay taxes when due should entitle the mortgagee to pay them and add the amount to the mortgage debt. This is a customary provision and if incorporated in the particular mortgage will simplify the collection of this item. As to the repair item, made in the mortgage to cover that.

If the mortgage fails to provide that it it is unlikely that similar provision is shall cover money disbursed by the mortgagee for taxes or repairs, the only recourse that is apt to be open to you is a claim against the estate of the deceased aunt for the aomunt due, with interest. But to enforce reimbursement against the estate it will be necessary to prove an unoutlawed agreement on the part of the aunt to repay the amounts so expended.

If proceedings to wind up the estate are not pending, you would have standing to seek appointment of an administrator, prove your claim and ask for sale of the property to discharge your entire claim.

Interest is collectible from the time that you were entitled to reimbursement for the money you spent.

The only feasible way for you to handle your interests under the existing circumstances is to place them in the hands of some dependable attorney and let him do the principal worrying as to how collection is to be enforced. But on your statement of the case we do not see where any real difficulty can be expected, unless others interested in the estate put you to proof of an agreement with your aunt that you were to be reimbursed for money advanced. However, your proof of actual payment of the taxes and for the repairs would raise an inference that there must have been an understanding that you would be reimbursed, unless there should be clear proof of circumstances negativing this inference.

ALL readers are invited to ask any questions that will help them solve any legal difficulty that they may be in. Our legal adviser will answer direct by mail and give his opinion as to the correct procedure. Questions and answers of general interest to the trade will be published in these columns. All inquiries must be accompanied by the name and address of the correspondent so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nome de plume. Remember that this service is free to subscribers. Address Legal Department, Building Age, 920 Broadway, New York City.

Right to Follow Another's Building Model

FROM H. H. C., Ohio—In handbooks published by the American Face Brick Association, by the Common Brick Manufacturers' Association of America, and also in BUILDING AGE, have been shown pictures of a house which we would like to use as a model for one we are to build for ourselves. I have asked the architect if he would not sell a set of plans for this house but have had no reply. We have made plans that would fit the exterior and would suit us. Now we would like to know whether it would be permissible for us to go ahead and build, following out the lines of the pictures as best we can.

Answer.—A careful research made by the law editor of this publication fails to disclose any bar to your doing this. It is not shown whether the illustration of the house is copyrighted. But even if it is we are convinced that that would not preclude your making the proposed use of it. But if the design of the house is novel and is covered by a special patent (which is extremely unlikely) the patented features would not be subject to use without the patentee's consent.

There are but few judicial precedents bearing on this particular question, but they show that while architectural plans may be protected by copyright so as to prevent another architect from copying them and selling or using the copies, any one may avail himself of ideas presented by the physical appearance of a building, except, of course, as to patented features.

In the case of Gendell v. Orr, 13 Philadelphia Reports, 191, plaintiff, an architect, sued to restrain defendants from copying the appearance of a novel porch or portico designed by plaintiff and constructed on a house owned by him. The suit proceeded on a theory that plaintiff had a common law right of property in his design which defendant had no right to appropriate. But the court denied an injunction, saying:

"The plaintiff undoubtedly, by natural justice, had a right of property in his design or invention, because of his labor bestowed, and that right exists as long as he maintains it unpublished for his private use or pleasure. . . .

"As the plaintiff has no copyright, it only remains to determine if he published his design or work. . . . To say that placing or erecting a design or work upon the highway, with an unrestricted view, and without notice of any privacy, for a period of three years, was not a publishing of it, would be a singular and unwarranted denial of the legal meaning of such a term. Any free exhibition of a work of art has been determined a publication, as well as the printing and circulation of a book. A dedication by the author to public use is not required to make the design public; any way by which the novelty or design is communicated or made known is a publication. Three years upon the highway must certainly be regarded as an abandonment of any right, else the copyright law, which confers the remedy and the protection the plaintiff now seeks, would become useless. It is a highly beneficial national law, easily availed of, and plaintiff had this long period to protect his rights. The public had a right to presume he abandoned or waived them after such a lapse of time. He cannot make his design public and claim protection, unless he complies with the law of congress."

Another pertinent decision is that handed down by the Appellate Division of the New York Supreme Court in the case of Wright v. Eisle, 86 N. Y. App. Div. 356. There it was decided that an architect who prepares for a client plans and specifications for the construction of a house, files such plans and specifications with the building department of the city in which the house is to be erected, superintends the construction and receives his compensation for his services, has no further property in the plans, and if they are, without his consent, used in the construction of another house, he is not entitled to recover the value of the plans from the owner of such other house.

In this case plaintiff, an architect, prepared plans and specifications for a client at Mt. Vernon, N. Y. Defendant, being pleased with the house on its construction being completed, attempted to buy duplicate plans and specifications from plaintiff. But on their failure to agree on a mutually satisfactory price, the negotiations ended and defendant retained another architect, who prepared similar plans and specifications. Plaintiff then sued to recover the value of the plans, etc., used by defendant, claiming that they were substantial copies of those filed by plaintiff with the city building department when the first house was built. Plaintiff contended that he had an exclusive common-law property right in the plans, but the contention was overruled by the Appellate Division of the New York Supreme Court, which said:

"There is probably no doubt that, so long as the plans for the Litson house remained in the possession of the plaintiff, they consituted personal property, and that no one had a right to take them from him or to make use of them without his consent. But he testified that he filed these plans and specifications with the building department as a preliminary to securing the consent of that department for the construction of the building, and that, this consent having been given, he superintended the construction of the house under these plans, receiving therefor something over $500. The law protects him in the first publication of his work; it guarantees him the right to receive compensation for his labor, and when this has been accomplished the purpose of the rule of law has been served, and at common law he can have no further rights in the work. . . . The act of publication is the act of the author, and when the latter has permitted the work to be filed in a public office as a step in furnishing the basis on which he is to receive compensation for his work we are of the opinion that, under the authorities cited above, the plaintiff has published his work to the world and can have no exclusive right in the design or in its production. This would seem to be specially true where the plans and specifications have been used in the construction of a building and the building has been exposed to the gaze of the public and has afforded the plaintiff the full value of his services. There is no evidence in this case that the defendant or any one acting in his behalf has copied the plans and specification on file in the building department. . . . It seems to us that all of the property rights in these plans, if they had any value as property after the publication, belonged to Litson (the owner of the first house) rather than to the plaintiff in this action, and that, under the evidence, there was a complete failure to establish a cause of action."

And, in the case of Smithmeyer v. United States, 25 Court of Claims Reports, 481, affirmed by the United States Supreme Court (147 U. S. 342), it was decided that there is no intrinsic property in an architect's design unless patented or copyrighted, and although if lost or stolen, a court of equity may possibly enjoin a use of such design by one not entitled to it, yet, an architect who voluntarily makes an unrestricted surrender of a design loses all right of property in it.

The two last cited cases recognize the general rule of law that "an architect ordinarily has no right to the ownership of a plan furnished to, and accepted by, and paid for by another, and plans forming an essential part of the building contract, unless proved to be the property of the architect (by express reservation), are deemed to be the property of the employer." (5 Corpus Juris, 259.)

As to the question of copyright, it is well settled by rules of the Copyright Office that architects' or engineers' plans or designs are subject to protection by copyright as "drawings . . . of a scientific or technical character." (Weil's "Copyright Law," p. 218.) And Mr. Weil adds (pp. 83-84) that "while it may be doubted if a work of architecture may be copyrighted, after completion, under the United States Act, no good reason seems to exist, under this section (Provision of the Copyright Act for copyrighting "models or designs for a work of art"), why adequate protection may not be obtained by architects, if they copyright their models or designs."

On a survey of the legal authorities, the law editor of BUILDING AGE reaches these conclusions:

Working plans, etc., such as architects usually produce for use in the construction of buildings are subject to copyright. But if they are used without being copyrighted, they may be copied by any one who lawfully may come into possession of them or copies of them. And an architect has no interest in plans, etc., prepared for a client after they have been used and he has been paid for them, except as he may have merely licensed their use by the client, as where an architect sells copies of his copyrighted plans, etc., to various persons for their respective and individual use.

But we do not believe, under the law as it now exists, that copyrighting of working plans, etc., would prevent one from using ideas gleaned from seeing a constructed house while passing along a public street or highway, or gleaned from the equivalent—seeing a photograph or picture of the house as completed. The architect may copyright the drawings, etc., that are useful to the builder and thereby prevent others from literally copying his drawings, etc. And illustrations may be copyrighted to give exclusive catalogue features, etc.

Expressions in the Philadelphia case intimate that a copyright would have protected the novel porch there involved, but we do not believe that those intimations made nearly fifty years ago can safely be relied on now. The decision was by one of the lower courts of the state and the reference to the effect of a copyright is to be regarded as *dictum* because not essential to the decision reached.

However, there seems to be little room for doubting that a building of novel form is a proper subject for a design *patent*, and that where a patent is obtained no one is any more entitled to copy it without the patent holder's consent than one would be entitled to copy a patented machine without such consent. This idea seems to have been present in the mind of the Court of Claims in the Smithmeyer case cited above, when it spoke of patenting an architect's design. The nature and elements of a patentable design are thus summed up by a standard legal authority:

"A patentable design may consist of a *new* and ornamental shape given to an article of manufacture or of an *ornamentation* to be placed upon an article of old shape. The design law was intended to encourage the decorative arts, and therefore deals with the *appearance rather than the structure, uses,* or functions of the article. *The design must be novel,* and must have called for an exercise of the inventive faculties as distinguished from ordinary skill. The patentability of a design does not depend on its aesthetic value. The design act, as construed by the courts, intends that the patentability of a design shall be determined by its appeal to the eyes of the ordinary man, and not to the eyes of a jury of artists. The same rules as to construction and validity apply as in the case of mechanical inventions." 30 Cyc. 828.

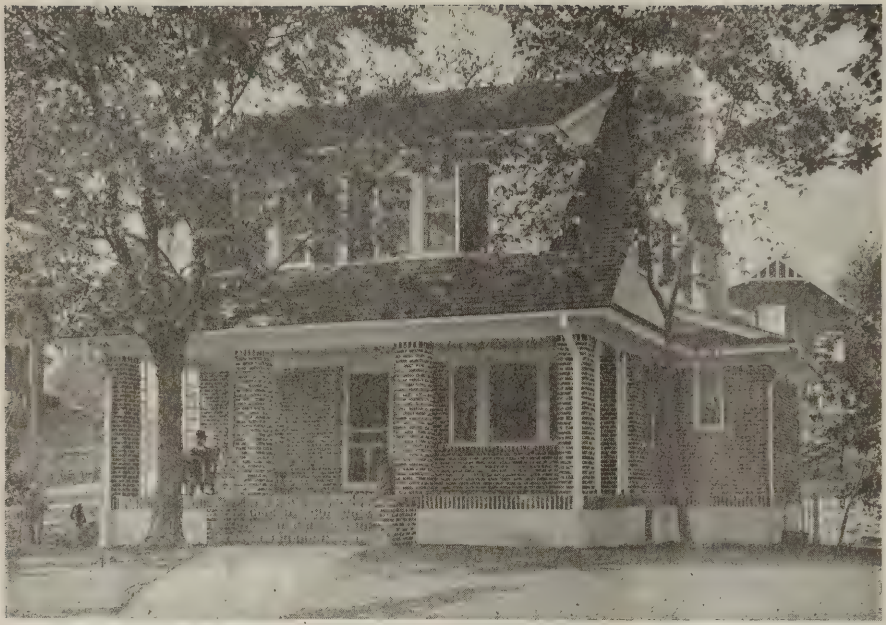
It was decided by a federal court that whatever ingenuity is displayed in producing a new design which imparts to the eye a pleasing impression, even though it be the result of uniting old forms and parts, such production is patentable. (129 Fed. 137.)

In passing, it is interesting to note the holding of the Pennsylvania Supreme Court in the case of Canfield vs. Johnson, 144 Pa. Rep. 61, that an architect is under no obligation to his client to copyright or patent the plans or design of a building prepared for the latter, in the absence of agreement to that effect.

It follows from what we have observed that it is our opinion that the gentleman from Ohio is entitled to proceed as he purposes to unless it should appear that one or more of the features he would like to copy are protected by design patent.

Attractive Brick House That Cost Only $4500 To Build

Leo Bugg Realty Co,
New York City



Home of Mrs. S. Bond, Larchmont, N. Y.

THE house of Mrs. S. Bond at Larchmouth, N. Y., is an attractive one and one-half story home. The effective treatment of the brick exterior is accomplished largely by a contrast of whites and reds, the whites being the concrete, the mortar joints and the white trim,—the red, of course, being furnished by the tapestry brick. The base course consists of brick laid on end, while the tread of the steps and the caps of the piers are laid with brick on edge. The window sills are also laid with brick on edge, and pitched upward to shed water.

The roof construction is simple and the continuous type of dormer makes for economy of construction.

The cellar is fully excavated and has a cement floor throughout. The heating is accomplished by a hot water heating plant.

The plan of the house is square, making for further economy of construction and consists of three rooms on the first floor and four rooms and bath on the second.

The living room is a large 12′-6″ x 23′-0″ room, with a fine tapestry brick fireplace built in the south wall. Built-in bookcases are another feature of this room. Three steps in the northwest corner of the room lead to a landing which communicates with the stairs of the second floor and directly with the kitchen. From the living room the front door leads directly on to a 9′-0″x27′-6″ porch paved with brick. A large open doorway forms the entrance between the living and dining rooms.

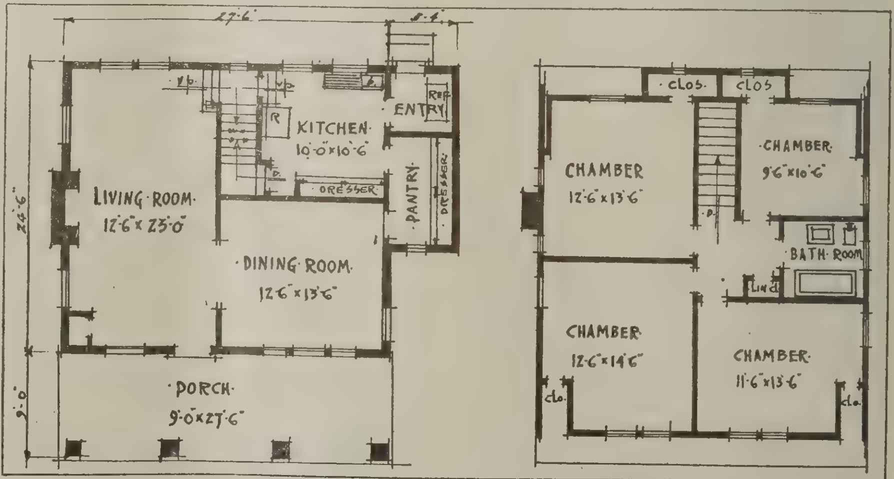
Modern kitchen cabinet, sink and gas range are the features of the kitchen. The refrigerator is located outside in the pantry, as it should be.

From the kitchen a door leads into the pantry with additional cabinets and work-tables. Another door leads from the pantry into dining room. This makes a fairly convenient arrangement for the house wife.

All the bedrooms on the second floor are large, with the exception of the one in the northwest corner, which is a square bedroom, 9′-6″x10′-6″. All are provided with ample closet space, and an additional closet for linen is in the upstairs hall next to the bathroom.

Economy of planning is shown in the small amount of hall space, namely, none on the first floor and a very small hall on the second for easy communication to the bedrooms and bath. The interior finish is white, trimmed with mahogany doors. Hardwood floors are throughout the house. In the dining room there is solid colonial panelling.

The plumbing is up-to-date throughout. In this connection the builder has gone to a slight additional expense by locating his bathroom somewhat away from the kitchen, in order to get the advantage of a corner bedroom, with its cross ventilation and also to make the actual framing of the house as simple as possible. This somewhat counteracts the slight additional framing expense.



Economical Square Plan Showing Seven Rooms of Ample Size

Lighting Farm Buildings by Electricity

Independent Lighting Plant—Storage Batteries and Generators

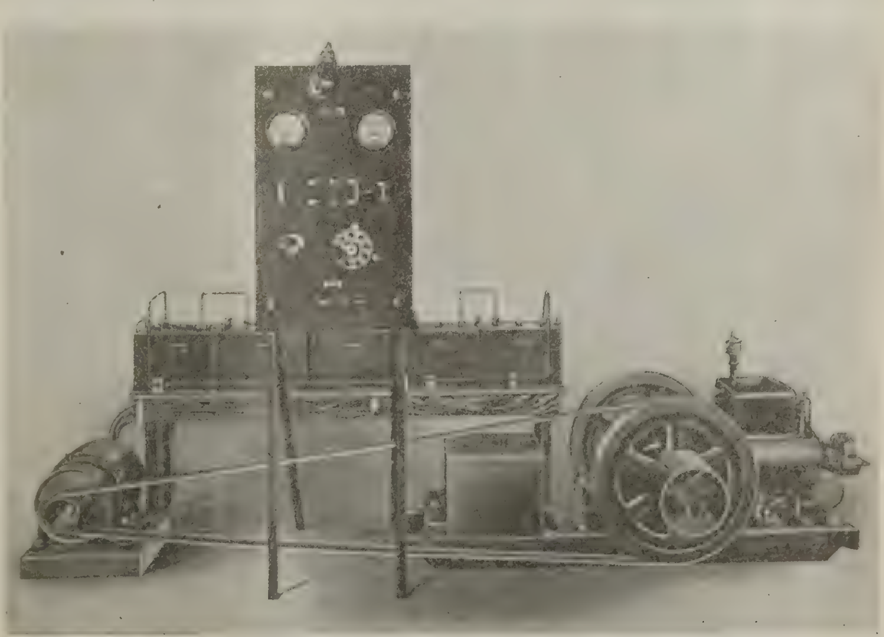
By **CHARLES L. HUBBARD**

WHILE the independent lighting plant has been designed especially for cases where central station service is not available, its use is by no means confined to such localities, and the small outfit operated by a gasoline engine, may, under certain conditions, prove more economical than purchased current.

Although designed primarily for lighting, the use of electricity for other purposes has enlarged the field of the small plant, especially in connection with farm buildings, and other cases where the operation of small motors is called for. It is easier to wire a building already constructed than to install gas piping; and furthermore, on the farm, where lights are not only required in the house but also in the barns and sheds and at certain points about the grounds, it is more convenient to run wires than pipes. Again, electric lamps are safer in barns than gas burners, where a flame is present as nothing can take fire by coming in contact with an ordinary incandescent bulb. While it is true that fires sometimes start from electric wires, it is always due to imperfect insulation and may be guarded against by proper workmanship. The adaptability of electricity to farm requirements has already been mentioned, and it will be found a great convenience both in the house and around the barns.

With a standard lighting outfit, power may be had for running sewing machines, vacuum cleaners, washing machines, electric fans, ice cream freezers, etc., while current is available for heating flatirons, percolaters, chafing dishes, toasters, heating pads, etc. Outside of the house electric power may be used to advantage in a variety of ways, along which may be mentioned pumping water, both for stock and house supply, for milking and operating dairy machinery, unloading hay, cutting ensilage, grinding bone and feed, running threshing machines, and sawing wood. Sometimes the farm equipment requiring power is so arranged as to be supplied with a direct drive from a gasoline engine, in which case the dynamo may be driven from the same source by means of a belt connection when the engine is not in use for other purposes or when the load is light. Under other conditions, where the farm is not equipped with an engine, it may be more convenient to install a complete electric unit including engine, and employ motors, either portable or stationary, for delivering the power wherever needed. Practically all outfits of the kind under discussion make use of gasoline or kerosene engines for motive power, but the method of operation may employ either the "storage battery" system or "automatic" system. The first of these makes use of a storage battery of such size that it need not be changed more than once or twice a week under average conditions, the current used for power and lighting being drawn from the battery between the periods of charging. In the automatic arrangement a battery is used with just enough storage capacity to start the engine and carry a few lights for a short time, after which, current will be supplied directly from the dynamo. Unit plants are made in various sizes by different manufacturers, varying in capacity from 10 to 600 or more 16-candle power lights. There are a number of standard makes of equipment upon the market and a study of the same may best be made from trade catalogues. A typical belted outfit consisting of engine, generator, storage battery and switchboard, is shown in Fig. 1, and serves to show the general construction and arrangement of such a plant. When more compactness is desired, the engine and generator may be direct connected, as illustrated in Fig. 2. There are two ways of distributing the power to the points required, as follows: The first is adopted to cases where the power is always to be used in the same places and in considerable quantity, and makes use of stationary motors supplied from a central generating plant. When the power requirements are comparatively small, and it is desired to operate machines in different places without multiplying the number of motors, a "power stand" may be used. This consists of a small motor mounted upon a tripod and provided with a flexible connection which may be screwed into a convenient socket, which in turn is connected with the switchboard.

A device of this kind may be used for a number of different machines commonly found upon the farm where the power required is within its capacity. A small motor of 1-16 to 1-4 horsepower is capable of drawing a churn, cream separator, washing

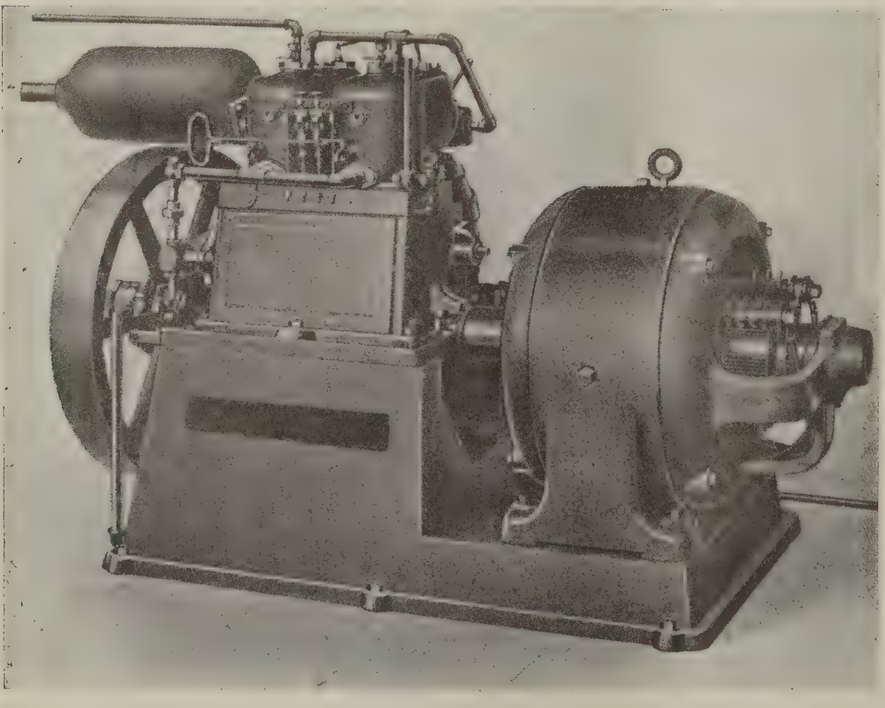


Small Storage Battery Set

machine, winnowing mill, bone grinder, pump for a small pressure system, etc. On farms where power is required for larger machines it may be advisable to supplement the power stand with stationary motors where its capacity is insufficient.

In operating a plant of the storage battery type it is only necessary to charge the battery once or twice a week, depending upon its size and the amount of current used. A storage battery for electricity may be likened to a storage tank for water, and holds, when charged, a given amount of energy. This may be withdrawn rapidly or slowly as desired, it making no difference with the total amount. A certain battery may store enough electricity to supply 20 lights—10 hours; but if it is desired to burn 40 lights for 5 hours or 10 lights for 20 hours, it may be done equally well, as the total amount of current consumed is the same in each case. Batteries are usually rated to carry a given number of lights a certain number of hours, but the actual way in which the current is used may be varied to suit conditions, as noted above.

It requires from 5 to 8 hours to completely discharge a battery, as usually rated, and it is recommended that one double the ordinary size be installed, as this can be done at a nominal increase in cost and will only have to be charged one-half as often. As it takes about 8 hours to charge a battery regardless of its size, it is evident that a larger one will be more convenient and require less care. However, it must be remembered that the power required from the engine will be in proportion to the electricity generated and stored in the battery, and will be twice as great in case of the larger battery noted above, although the time for charging will be the same in each case. While a battery may be recharged when only partially discharged, it is essential for long service that it be completely discharged and then completely recharged about every third or fourth time. With the storage battery arrangement, electric current is available for lighting or power at any time day or night. Charging a storage battery is like pumping water into an elevated tank, thus giving a supply at the faucets regardless of whether the pump is running or not. Batteries may be charged when lights are burning or power required for other purposes, as the current will be required for the load will be taken directly from the dynamo while any surplus generated will be stored in the battery. In case of the automatic system, previously mentioned, the operation is much the same in principle as with the outfit employed on an automobile, and consists of an engine, dynamo, and a small storage battery for starting the engine and carrying the load for a short time. If only a small number of lights are in use, say 5 to 10 per cent. of the total, the current will be supplied a short time from the storage battery. After this period the engine starts automatically, thus supplying the lights directly from the dynamo and at the same time recharging the battery. When the lights are shut off until only a few are left, the engine stops itself and the remaining lights are supplied by the battery as before.



A Gasoline Generator Set

The size of the plant required will of course depend upon the number of lights to be supplied and the power requirements. Standard outfits are made for 10, 25, 40, 50, 75, 100, 200, 300, 500 and 600 lights, and so on. The small house of six to eight rooms and average size barn will require a 25 light outfit, which furnishes sufficient power to operate an electric fan, vacuum cleaner, cream separator, churn, washing machine or other device of similar requirements. For a house of eight to ten rooms, with large barn and outbuildings, a 40 light outfit will be found about right. For large dairy farms, including milking machines and other equipment, plants ranging from 50 to 100 lights will be required. As regards cost of equipment, it is best to obtain quotations as needed. Prices change so rapidly that published data relating to this point are of little value at the present time.

Cost of operation may be based on a given price of gasoline, from which it is an easy matter to make the necessary changes to correspond with current prices. The following figures are taken from the catalogue of one of the leading manufacturers of equipment of this kind and are based on gasoline at 30 cents per gallon. According to this data, 1 cent's worth of electricity developed by this company's equipment will operate:

A 16 candle power 20 watt lamp for 7 hours.

A 6 pound flatiron 25 minutes.

A pump large enough to raise 250 gallons of water 80 feet.

An electric washing machine ¾ hour. A toaster large enough to produce 10 slices of toast.

A sewing machine 3¼ hours.

A percolator large enough to produce 6 cups of cofee.

A heating pad 2½ to 3 hours.

A water heater, and bring to a boil 0.4 gallon of water.

As regards location, it is never convenient to keep the switchboard and battery in the same room with the generator although this is not necessary for the operation of the plant. The battery works at its

(*Continued on page* 53)

Tearing Down Old Business Buildings

How to Proceed with Wrecking Jobs with Safety to Workmen and Public

By **W. E. WELCH**
Senior Contract Inspector, Traveler's Insurance Company

THE steel frame and iron, wall bearing, type of buildings, generally are in the downtown section of the city, and are old style buildings, principally, but in some cases are of comparatively recent construction. Wrecking methods of each type vary in some important details, which will be taken care of as well as possible in this paper.

In the comparatively recent construction we have the usual steel frame with all members riveted together. Wall bearing buildings are of the period 1880 to 1900 and have cast-iron columns for interior bearing and wrought iron I-beams, all of which members are bolted together. Cast-iron lintels bridge the window openings. The front elevations of these buildings are generally marble, granite or limestone, backed up with brick.

Brick work in recent all steel construction is about half the thickness of enclosing walls of wall-bearing iron construction. Wall bearing buildings seldom exceed 12 stories in height and walls generally are 32 inches thick at street level, thinning out to 16 inches at top floor. On these old buildings, the stone is heavy, in large pieces, as for instance, lintels weighing 3 tons and coping and courses weighing in some cases 10 tons.

Floor arches of wall bearing buildings are yellow clay tile or brick, arching from beam to beam and will not stand as much debris as modern red tile construction. Often men are seriously hurt and even killed by the failure of old style arches during demolition. The floor arches are covered with a fill of ash concrete and 4x4 inch scantlings, covered with wooden flooring. In some cases we have the Mansard roof, or French type of roof, covered with slate. You meet with hanging ceilings, now and then, and as a rule they are dangerous and should be removed immediately. I have known of cases where they have dropped (the whole ceiling has dropped) for no apparent reason, but probably from vibration of wrecking operations.

In all steel frame building wrecking or wall bearing type, a guy derrick should be used for the reason that while there is lost motion in booming up to escape the guys there are compensating advantages principally in the lowering of the derrick when it is to be placed on a lower floor. A guy derrick can be taken down and set up on one or two floors below in about two hours, while a stiff-leg derrick would consume a day and a half for the same operation. Also, the guy derrick being turned from the mast, better and safer control of the swinging load is obtained. Also guy derrick covers all points while stiff leg is limited to a ¾ swing. This derrick is used for the dismembering of steel and the lowering of the wrecked material directly to trucks in the roadway and for short storage on the sidewalk shed.

The first proceeding is for the wrecking contractor to disconnect the service lines, leading into the building, of gas and electricity, the water connections to remain. A sidewalk shed should then be immediately constructed for the protection of the public using the sidewalk in front of the building. This shed should be constructed before anything else is done, whatsoever—before any wrecking of any character is done, with the exception of the severing of the service connections.

This shed should be substantially constructed and the roof extend from a point vertical with the curb to facade of building. It is important that the covering on this shed should butt against the front of the building to prevent possible falling materials from dropping between shed and wall and injuring passing public. In ordinary work of this kind the shed has a space of from 2′ to 3′ from the building, which is very poor practice. The upright posts of the sidewalk shed should be constructed of not less than 8″ square posts and horizontals, beams on these horizontals to be of 3x10″ planks and covered with 3″ planks.

For better fastening, upright posts of sidewalk shed should be placed on

Safety First—Wrecking Large City Building a stringer running parallel to curb but at least 12″ in from curb. Posts should not project beyond the curb side of stringer. This to prevent hubs of trucks from striking posts, which impact would not only knock out post but would cause truck to turn in front and skid dangerously outward in rear. In a double horse-drawn truck the pole would turn in and cripple the inside horse. Posts should be centered about 8′ and beams about 15″. The inner posts of the sidewalk shed should be lined with ⅞″ boards from the sidewalk level to the shed roof for protection of passing public.

On the outer edge of roof of shed should be a wood or wire mesh vertical protection about 4′ in height to prevent material from falling into street.

Shed for Temporary Storage

The shed is not only used for protection but also for the temporary storage of material waiting to be loaded into trucks. Trucks do not always appear as ordered or promised and so as not to delay the work, the derrick places this material on the shed temporarily. This is also done when conditions become congested on the building and more room is required for wrecking purposes. The use of shed for storage purposes should be to a limited extent and with caution.

There are a number of different kinds of work in progress on the start of the wrecking such as the sidewalk shed construction, roof removal, window glass removal, boarding up of the windows as soon as the glass is removed, lighting up of the stairways and different floor levels as soon as the windows are boarded up, partition removal, dismantling of all heating, plumbing and electrical equipment and chute construction. In most buildings there are one or more elevators. One elevator is left to run until removal of roof over elevator shaft exposes elevator overhead machinery and shaft. It is then dismantled. This elevator is used for the taking from each floor, radiators, doors, fixtures, etc., to the ground floor. From the ground floor they are carried across the sidewalk and loaded into trucks.

All the time this type of wrecking is going on, a jenny-wink derrick is being rigged on the roof, having been pulled up through the stairwell by block and fall. The engine, preferably operated electrically, being installed on the first floor or street grade floor. When power is obtained for engine the cables are attached by jenny-wink, holes being punched through the floors for this purpose.

Derrick Has Six Guys

The mast and boom of a size adequate for the work, are then raised separately to the roof and derrick erected on the floor immediately below the roof if it is for a wall bearing type of construction. There should be 6 guys to the derrick and an extra loose guy which should be placed directly on a line behind the boom when it is lowered over the street for loading or when about to pick up an extra heavy load.

The guys should be preferably of plow steel and not galvanized wire, guys to be attached to the steel frame by hand manufactured wire anchors, not chains. All sling and spreader equipment for derrick to consist of hand manufactured wire type, no chains. All these hand manufactured wire anchors, slings, spreaders and bridles should have an equalizing feature to permit all parts to bear equal strain. Also for the lowering of small stone and small pieces of junk to trucks wooden scale boxes to be used with a 4-leg wire sling. All the sling and spreader equipment should be of wire with the exception of when the derrick is about to lift a beam or number of beams out of its framing, a 1″ rope sling should be used. This acts as a safety measure—should the beam be imbedded too strongly—or held by an overlooked bolt the rope will part before the derrick can be pulled down. A "spreader hook" sling is used to pile up the beams for a load on the wrecking floor. It is very essential that all derrick equipment be of first-class material and workmanship.

Wooden chutes are used to load trucks with brick and debris. The chutes should be not less than 40″ wide and 20″ high. A narrow chute would cause bricks and debris to jam. Bottom of chute should be of either 3″ yellow pine or 4″ spruce. Thinner plank would wear out and require difficult replacement. Yellow pine chute should not be as steep as spruce, becoming very slippery with use. Sometimes open sectional steel chutes are used within the building. These are 32″ wide and 8′ long, with 8″ sides, similar to a large coal chute. They are lapped at the ends and held together with wing nuts. These are ideal when bricks are to be lowered without damage to the bricks as they are smoother than lumber and need not be pitched so steep.

The main chute runs from the outer edge of the shed roof at about 50° angle for four floors; it then zigzags every two floors to the roof, but the zigzagging depends on the space in the building. At the point where the chute zigzags there is an opening to throw brick and debris so that workmen can be used on the different floor levels as well as at the point where walls are being razed.

Brake At End of Chute

At outer end of chute is a brake consisting of an obliquely hung door about 7′ to 8′ long 3″ plank, held together with cross boards, slightly narrower than chute width. The lower edge is flush with the lower end of the chute. The upper is held by three long strap hinges, screwed to the chute top. Nailed to side of chute, and jutting upwards vertically over end of chute, are two 3″x4″ posts, about 5′ high, crossed at the top by a 3″ x 4″ scantling. On this a light block is hung. A single rope through this raises the brake. The chute brake is held down by a 3″ x 4″ scantling placed upright between the crosspiece on which the block and fall hangs and a cleat on the end of the brake. This is when bricks are coming down and the chute is being filled.

In addition to this door or brake, there is another door or brake on hinges attached to the bottom end of the chute which is used primarily to convey the brick or debris from the end of the chute into the middle of the truck. When not in use, it is raised vertically and then acts as a secondary safety.

At the second floor level above the shed is a safety brake in the chute always in charge of a workman. There is only the zigzagging between this brake and the point where walls are being razed. It is, therefore, very essential that the safety brake and the brake at the end of chute should not be opened at the one and the same time. The brick and debris are held in the chute by the safety brake. About a truck load is allowed to be in the chute below the safety brake. On outer side of the truck is placed temporarily, a wooden shield about the length of the truck-body and 2½ to 3′ in height, while the truck is being loaded to prevent material from falling into roadway and injuring passing traffic. I have seen the shield broken to pieces and debris and brick fly for a distance of 20′ when, by some error, the safety brakes were opened at the same time. It might be said, Why not install some device that would prevent both brakes being opened at the same time? Perhaps we will get to that later, but we have not reached any conclusion up to the present time. Teams are also loaded with brick and debris inside the buildings on the first floor or the basement levels. The regulation chute is constructed and runs three or four floors. By this method, debris on the first two floors is removed at the same time as debris from above. A plank team or truck runway is laid on the sidewalk into the building and the arches covered with 4″ planks for the truck or team loading. When planks are laid on the sidewalk, an additional plank is placed against the ends and sloped so as to prevent a tripping point. In addition it would always be well to see that the sidewalk is properly shored to take the load of truck passing over same.

Any material that falls from an 8-story or 10-story building would, in most cases land in the center of the roadway and not on the bridge. In order to prevent this, as well as a protection to men on the walls, an outrigger protection or platform should be installed every two stories. This outrigger should consist of 8″ I-beams thrust out of the windows and the inner ends secured to the floor beams by wrought iron straps. Wooden beams should never be used as they are liable to be broken by chunks of brick from walls or other material.

These beams should be spaced about 8′, extended outside the walls about 6′ and covered with 3″ planks. On the outer edge of these platforms should be installed a wire mesh protection about 4′ in height. On a building I was inspecting, two of the top stories were of Mansard type and covered with slate. Each individual slate had to be removed separately. If the workmen had let fall the slate, the protection would have caught it, otherwise it would have fallen to the street and perhaps, cut someone's head off. The same with a brick. You can get some disagreeable financial results from a brick falling on a passing man or woman. I know of a case where the injured party collected $40,000 for a brick falling from a building, and it was not a gold brick either.

Safety Methods Are Same for Small Buildings as Large

In order to facilitate the wall wrecking where the walls are over a foot in thickness, and laid up in hard cement mortar, holes are drilled horizontally by air-operated drills on a center of about 18″. In most cases, the men using these drills should wear respirators as the dust from this drilling is very thick and the drilling sometimes has to be done in confined places and the windows are generally boarded up—so respirators are quite essential and should be used.

After the holes are drilled, the drillers keeping one story below the wall men, the wall men drive wedges into the holes thereby loosening the brick which, if in chunks, is allowed to drop to the floor where these chunks are broken up by mauls, loaded into wheel-barrows or 2-wheeled carts and dumped into chute.

Heavy Stone Loosened by Pinch Bar

Heavy stone is loosened by pinch bar, hoisted inwards by derrick, and the derrick lowers same to truck in the street. The pinch bar is also used for the loosening of the brick. The pinch bar is *the* wrecking tool of the wrecker. They do wonderful things with this tool. It is a steel octagon bar about 4′ in length, turned up or heeled on one end about 3″ and sharpened to a wedge shape with tempering. It is wonderful what skilled wreckers can do with this bar. The steel frame is disconnected by acetylene burners. In wrecking parlance, this acetylene torch is called a burner. The beams are burned from the frame work and the connecting plates of columns, the derrick, of course, being attached to column or beam, while this is being done. In the wall-bearing type, the members being connected by bolts, the bolt heads are removed by wrench or knocked off with maul, the derrick having hold of the member being released.

On every two floors, the stairwells and elevator shaftways are covered to prevent brick and debris from falling below that level and also for the protection of the men. Heavy I-beams and 4″ planks are used for this covering.

In some cases where conditions are right, pinch bars are placed in the drill holes for a scaffolding support in razing walls; otherwise they stand on the walls in loosening the brick with the pinch bars, or sit down, as scaffolding is not practical for this type of work. In most cases, false framework should be installed in all arched windows and overhanging coping should be shored as well as light shoring placed in windows for overhanging lintels.

(*Continued on page 53.*)

What the Editor Thinks

Quantity Production of Houses

THERE are two ways of constructing homes, singly and in quantity. Very little money has heretofore been saved for the ultimate owner in the past by quantity building, as he took no part in the original financing. To illustrate:

Cost of house	$4,500.00
Cost of land	1,000.00
Expenses (search, etc.)	300.00
Profit	1,500.00
	$7,300.00

Fifteen hundred dollars sounds like an overcharge. The contractor seldom sells before the house is completed—generally months after completion. Then out of this profit must come expense.

The contractor, in order to refinance, must get money to continue with his work. This means that he has to buy it (premium). He has to pay interest on this and on the money that he has on first mortgage. He has to pay an agent's commission for the sale of the house. Also sale of 2nd mortgage at a loss.

All these things will add up to $1,500, and if he wants a profit he will have to sell this house for $8,300—up.

The weakness of this system is not the production of houses but the lack of proper organization in planning his sales campaign.

Starting from a new beginning—

Remove the pressure of sales from the builder and his efforts will produce the $4,500 house for $4,000.

The ultimate buyer is to invest his money, so why not during the time the entire operation is being planned. Therefore, our tabulation will look like this:

If a $4,500 *actual* cost means a sales value of $8,000 then a 50 per cent. 1st mortgage on sales value will mean a $4,000 mortgage. Therefore,

Cost of house	$4,500.00
Cost of land	1,000.00
Expenses	300.00
Profit	500.00
	$6,300.00

Based on this the institutions that hold the people's money should loan at least $500.

The ultimate owner should put up the balance of $1,300.

If the theory that $500 can be saved by concentration is true then the ultimate owner has only to put up $800. Now let's take a solid example of figures. A program is laid out to produce 300 homes. There should be a saving of at least $200 a lot by concentrating in the buying of 300 lots. This saving would let the buyer down with $500 investment. Therefore, I suggest this as a reasonable demonstration.

Find 300 people who have $500 each. This is an easy matter if properly handled through the press, and a proper board is formed.

$$\underset{\text{8 sets of forms}}{300 \text{ x } 500} = \frac{150{,}000}{30{,}000 \text{ actual investment}}$$

Four houses a week will mean that, with loans guaranteed, at the end of 45 weeks the 300 houses will have been completed and the average investment of the people's money is 22½ weeks and no premium paid—no sales expense.

Work, Save and Prosper

THERE is a period of vast wide rebuilding before us that will turn the world, and more particularly this country into a beehive of activity, and upon this constructive boom there can be erected a generous and substantial prosperity for all, is the inspiring substance of conclusions arrived at by recent comprehensive investigation by Dave H. Morris, president of the St. Louis & Southwestern Railroad. Mr. Morris sends his views upon the present situation to the New York *Commercial* while on a visit to the Far East. He says:

"On one of my arrival into the port of New York, I was standing by the side of Sir William van Horne with whom I was associated in the Cuba Railroad, and it was during a greatly depressed business year, and I well remember something he told me. It was: 'Anyone who is a bear in America is sure to go broke; all he needs is time.'

"It seems to me that all of us should feel the truth of that statement and that we should have the courage of all its implications. There never has been a time in history when so much capital has been destroyed and when, therefore, there exists the necssity to rebuild. And this rebuilding, when once the circle can get started, will make a beehive of the earth.

"We need confidence to go ahead and surely this is an American quality. In my own railroad, we showed this confidence to a degree that has met with a splendid reward, for we refused the Government guaranty, went it alone, and came out ahead. I think we were about the only company who was fortunate and brave enough to achieve this record, and I show it to indicate that all is not lost.

"I am traveling with a vice-president of a San Francisco National Bank, and he feels that Russia must soon come into her own again, and that means international trade again as heretofore, and that we must get ready for it.

"In going from New York to the West I was struck with the very large number of people traveling for pleasure and getting vacation for the wife and whole family. Trains were crowded and additional equipment that had been taken off put on again. Thousands of automobiles were lining the highways and at the Yosemite notice had been sent out that no more could be accommodated. What does all this mean? It is true that freight was low, almost gone, yet all these crowds had the money and courage to spend money in the most extravagant way.

"The population of the world has

never been so large; it has been educated to a higher standard of living than ever before; machinery is more efficient than at any time in history; trade must result. The country that makes the best and cheapest goods is going to win out. It is within our grasp to dominate the situation; if we have the intelligence and the faith to do it. We must work; we must save; we must take what we can get, and we must not live in a land of wrong economic ideas."

Tenements No Longer Sound Investment?

WRITING to the New York *Evening Mail,* Nathan L. Ottinger, a real estate appraiser and negotiator, states that "the day for the construction of tenement houses as far as Manhatan is concerned is past. After ten years of hardship with tenement property through the years 1908 and 1918, during which period thousands of such properties were sold under foreclosure, the owners thereof lost in many cases the accumulated savings of a lifetime; large loans and easy money having caused overproduction of tenements, causing rents to fall to abnormally low and losing figures so that the owner could not collect enough money to meet his interest, taxes and upkeep, comes the time, as now, when a fair return on such type of property would be welcome and also encourage the production thereof, and the politicians step into the field, play to the public clamor to hold down the price of rents and enact a law antagonistic to the laws of natural economics.

"With high land values, high cost of building, rapid increases in accessed value and tax rate, high interest rates on mortgage, high general upkeep costs (especially coal, liability, rent and heavy fire insurance covering, as required by mortgagee, on account of increased replacement cost in case of fire), and the utter disregard of many tenants of a sense of justice in their dealings with the landlord, often perjuring themselves in open court when they are asked by the presiding justice concerning amount of heat furinshed or on the matter of repairs, how, I ask, can there be any one foolhardy enough to go into a sure losing game and produce tenement property? It is an unanswerable proposition.

"The poorer class of people will have to move to the suburbs on cheap land built upon by the co-operative plan, as few builders will even take the risk after the results that have been shown since the enactment of the rent laws, which limit the income but leave the outgo unlimited, subject to the caprice of the politician."

Whether we agree with Mr. Ottinger or not the fact remains that today the scene of building construction has moved to the smaller cities and the large city apartment is winning a place for itself in the smaller towns.

Review of Building Situation

CONSTRUCTION activity in July, according to figures published by the F. W. Dodge Company, was 7% less than in June although it was 4% greater than in July, 1920. Contracts awarded during July in the twenty-seven Northeastern States of the country amounted to $212,491,000.

Although the increases in building operations which were expected to develop in the summer months have not materialized, construction activity has held up very well in comparison with other lines of business.

During the first ten days of July the volume of building contracts was very low, while the last three weeks showed total figures of considerable magnitude.

Discussions of wage scales in many centers have been protracted and settlements have been delayed. Confidence in the stability of construction costs has not yet been generally established, although it is the opinion of a number of reliable authorities that necessary construction enterprises may be undertaken now under as favorable conditions as are likely to prevail at any time in the near future.

The total volume of building contracts let in the territory covered by the Dodge Company during the first seven months of this year has amounted to $1,278,747,000, which is 10% greater than the average figure for the first seven months of the preceding five years.

Residential building continued in the lead over all other classes in July, amounting to $60,452,000, or 28% of the total. Public works and utilities amounted to $46,902,000, or 22% of the total; business buildings, to $33,240,000, or 16%; educational buildings, to $28,602,000, or 13%; and industrial buildings, to $13,604,000, or 6½%.

Contemplated new work reported from January 1 to August 1, 1921, has amounted to $2,838,000,000, more than double the volume of contracts awarded in the same period.

CONTRACTS AWARDED

	CLASS OF BUILDING						
Section of Country	Residential	Industrial	Business	Public Works and Utilities	Educational	Other	Total
New England	$ 7,057,600	$ 1,236,700	$ 2,174,500	$ 2,230,900	$ 5,296,300	$ 2,827,200	$20,823,200
New York District	22,161,300	4,259,000	11,005,700	5,317,300	4,788,700	5,443,700	52,975,700
Middle Atlantic	7,169,700	980,000	4,355,700	7,362,300	2,570,500	3,904,200	26,342,400
Pittsburg District	10,191,600	2,279,300	4,226,500	15,305,800	5,021,200	5,996,500	43,020,900
Middle West	10,495,500	4,660,000	10,539,900	13,161,600	8,570,200	10,817,100	58,244,300
Northwest	3,376,200	188,800	937,500	3,524,500	2,355,200	702,100	11,084,300
Total	$60,451,900	$13,603,800	$33,239,800	$46,902,400	$28,602,100	$29,690,800	$212,490,800

CONTEMPLATED PROJECTS

	CLASS OF BUILDING						
Section of Country	Residential	Industrial	Business	Public Works and Utilities	Educational	Other	Total
New England	$ 8,779,000	$ 1,361,700	$ 6,068,000	$ 5,821,200	$ 2,640,600	$ 5,294,600	$ 29,965,100
New York District	43,316,900	5,081,000	12,248,200	5,446,000	2,605,800	5,592,100	74,290,000
Middle Atlantic	11,876,600	1,561,000	5,180,200	10,149,200	4,599,600	5,398,400	38,765,000
Pittsburg District	23,269,300	5,952,600	7,230,500	13,770,100	6,491,900	11,886,000	68,600,400
Middle West	20,034,800	13,169,500	19,843,200	21,790,500	10,338,800	14,595,700	99,772,500
Northwest	4,017,200	935,500	4,282,000	3,540,300	2,973,500	1,524,200	17,272,700
Total	$11,293,800	$28,061,300	$54,852,100	$60,517,300	$29,650,200	$44,291,000	$328,665,700

Trend of Material Prices

THE following are wholesale prices of basic building materials in the three markets which set prices for the rest of the country.

These prices are presented to show the trend of the wholesale market, which forecasts prices in the retail market. They are not prices which the average contractor can buy at, but are quoted to show him the movement of materials so that he can buy to better advantage.

Followed in conjunction with the Review of Building Conditions, these prices will prove invaluable.

All prices are for carload lots, F. O. B. market quoted, unless otherwise noted.

NEW YORK PRICES

	July 23	August 19
LONG LEAF YELLOW PINE		
B. and Better Flat Grain Flooring, 2½" Face	$54.00	$54.00
Dimension, S1S1E, No. 1 Common, 2x4", 10'	38.00	38.00
Timbers, Merchantable, '05, 12x12", 10 to 20'	47.00	47.00
B. and Better Ceiling, ½x3¼	36.00	36.00
B. and Better Finish, 1x4"	51.00	51.00
No. 1 Common Boards, 1x8"	40.00	40.00
NORTH CAROLINA PINE—		
No. 2 and Better Flooring, 13/16x2½"	$55.00	$55.00
Roofers, 13/16x5½"	29.00	26.50
DOUGLAS FIR—		
No. 2 Clear and Better V. G. Flooring, 1x3"	$75.50	$75.50
No. 1 Clear V. G. Flooring, 1x4"	.....	.....
No. 2 Clear and Better Ceiling, ⅝x4"	35.00	35.00
No. 2 Clear and Better Novelty Siding, 1x6"	42.25	42.25
No. 2 Clear and Better V. G. Stepping	87.00	87.00
Dimension, S1S1E, 2x4", 16'	40.00	40.00
Timbers, S1S1E, 12x12", 16'	50.00	50.00
WESTERN RED CEDAR—		
B. C. Perfection Shingles, per M	$7.30	$7.45
Washington Perfection Shingles, per M	6.90	7.15
Clear Bevel Siding, 1½x6"	45.00	45.00
CANADIAN SPRUCE—		
No. 1 Lath, 1½"	$8.50	$8.50
Dimension, 2x4", 10 to 16'	47.00	48.00
HARDWOOD FLOORING—		
Clear Quartered White Oak, 13/16x2x2¼"	$148.75	$148.75
Clear Plain White Oak	108.75	108.75
Clear Maple, 13/16x2¼"	97.50	96.50
Clear Quartered White Oak Parquetry Strips, 5/16x2"	143.50	143.50
Clear Plain White Oak Parquetry Strips	99.00	99.00
(All lumber prices furnished by LUMBER)		
COMMON BRICK—		
Per M. f. o. b. job	$18.40	$18.40
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers, f. o. b. dock	2.40	2.40
STRUCTURAL STEEL (IRON AGE)—		
Cents per lb. to large buyers	2.38	2.23
CRUSHED STONE (cu. yd.)—		
¾ in.	$3.00	$2.65
1½ in.	2.90	2.50
WALL BOARD—		
Per 1,000 sq. ft. in lots under 1,000 sq. ft.	$52.50	52.50
Per 1,000 sq. ft. in lots 1,000 to 2,500 sq. ft.	47.50	47.50
METAL LATH—		
2.3 lb.—warehouse price per 100 sq. yd.	$22.64	$22.64
2.8 lb.—warehouse price per 100 sq. yd.	26.60	26.60
3.4 lb.—warehouse price per 100 sq. yd.	29.33	29.33
Add 5 cents per sq. yd. for galvanized.		
LIME (Hydrate)—		
Finishing, per ton	$26.00	$26.00
Masons, per ton	20.50	20.50
SAND AND GRAVEL (cu. yd.)—		
Sand	$1.80	$1.60
¾ in. gravel	3.40	2.85
1½ gravel	3.40	2.85

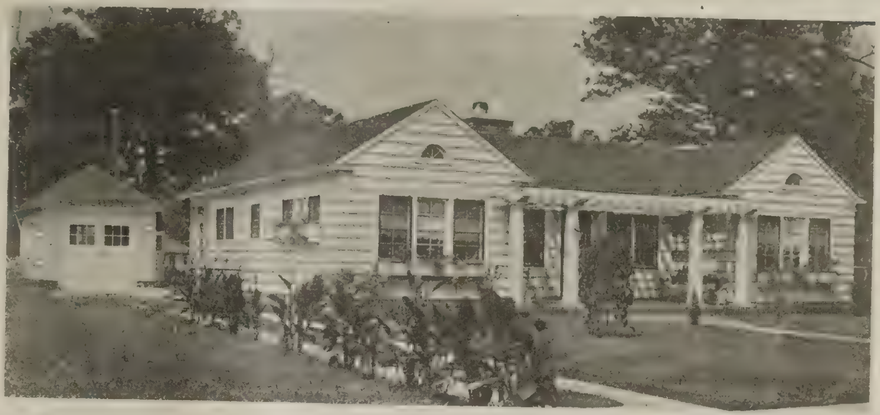
CHICAGO PRICES

	July 23	August 19
YELLOW PINE—		
Boards, 1x8, No. 1 Com	$32.00	$32.00
Casing and Base, 4-6 in.	55.00	55.00
Ceiling, ⅝x4, B. and Btr	36.00	36.00
Dimension No. 1, 2x4, 12 to 14 ft	31.00	30.00
Drop Siding, 1x6, B. and Btr	38.00	38.00
Finish, 1x4, B. and Btr	50.00	50.00
Flooring, B. and Btr. E. G., 1x3	68.00	70.00
Flooring, B. and Btr. F. G., 1x3	42.00	47.50
Lath, 4 ft., No. 1	5.60	5.90
Timbers, Long Leaf No. 1, 10-20 ft., S4S, 6x12 to 12x12	39.00	39.00
NORTHERN HEMLOCK—		
Boards, No. 1, 8 to 16 ft., 1x6 to 8 in.	$31.00	$30.00
Lath, 4 ft., No. 1	9.25	9.25
DOUGLAS FIR—		
Boards, No. 1, S2S, ¾ in., 1x8 to 10 in.	$28.75	$28.75
Dimension, No. 1, S1S1E, 8 ft., 12 ft., 14 ft., 2x4 in.	29.00	29.00
Drop Siding, 1x6 Pat. 106, No. 2, C. and Btr	35.50	35.50
Flooring V. G., 1x4, No. 1	65.50	65.50
Lath, 4 ft., No. 1	7.40	7.40
Timbers, No. 1 Com., 12x12 in. and under, 40 in. and under, rough	36.00	36.00
HARDWOODS—		
Maple Flooring, 13/16x2¼, clear	$94.75	$94.75
Oak Flooring, 13/16x2½, Cl. Pl., White	98.00	104.00
REDWOOD—		
Bevel Siding, S1S1E, 10 ft., 20 ft., ½x4, clear	$38.25	$38.25
Finish, S2S or S4S, 1x6 to 8 in.	91.50	91.50
WESTERN RED CEDAR—		
Bevel Siding, ½x4 in., Clear	$42.00	$42.00
Shingles, Extra Clears, 16 in.	4.26	4.06
COMMON BRICK—		
Per M. f. o. b. job	$12.00	$12.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers	$2.47	$2.17
STRUCTURAL STEEL—		
Cents per lb. to large buyers	2.38	2.23
CRUSHED STONE (cu. yd.)—		
¾ in.	$2.25	$2.25
1½ in.	2.10	2.10
WALL BOARD—		
Per 1,000 sq. ft. in lots under M.	$57.50	$57.50
Per 1,000 sq. ft. in lots 1 M to 2½ M.	52.50	52.50
SAND AND GRAVEL (cu. yd.)—		
Sand	$2.25	$2.50
¾ in. gravel	2.25	2.50
1½ in. gravel	2.25	2.50

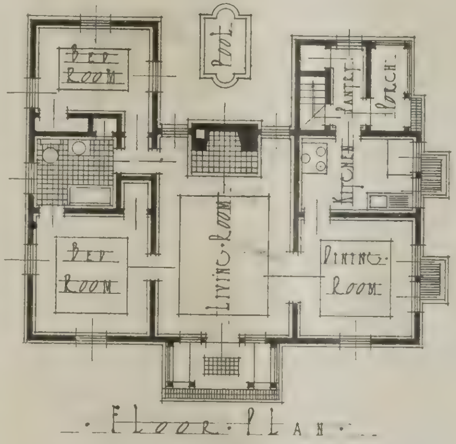
ST. LOUIS PRICES

	July 23	August 19
YELLOW PINE—		
Boards, B. and Btr., E. G., 1x3	$66.00	$68.00
Ceiling, ¾x3¼, B. and Btr	39.50	41.00
Dimension, No. 1, S1S1E, Short Leaf, 2x4 in., 12 & 14 ft.	28.50	27.50
Finish, S2S, B. and Btr., 1x4	47.00	45.00
Flooring, B. and Btr., E. G., 1x3	66.00	68.00
Flooring, B. and Btr., F G., 1x3	40.00	47.00
Lath, 4 ft., No. 1	5.50	5.70
Timbers, No. 1, rough, short leaf, 6x12 to 12x12 in., 10 to 20 ft.	36.00	32.00
DOUGLAS FIR—		
Ceiling, F. G., ⅝x4 in., No. 2, Cl and Btr	$29.50	$30.25
Dimension, No. 1, S1S1E, 2x4 in., 8, 12, 14 ft.	30.00	30.00
Drop Siding and Rustic, 1x6 in., No. 2, Cl and Btr.	37.00	35.50
Finish, F G., S2S or S4S, 1x4 in, No. 2 Cl. and Btr.	61.25	65.25
Flooring, 1x4 in., No. 1, Cl., V.G.	65.50	65.50
Stepping, V.G., 1¼x10 in. & 12 in., No. 2, Cl. & Btr.	77.75	77.75
CALIFORNIA REDWOOD—		
Finish, S2S, Cl., 1x6 in.	$91.50	$91.50
Siding, 4 in. Bevel, 10 to 20 ft.	38.25	38.25
8 inch Colonial	66.75	66.75
8 inch Bungalow	68.75	68.75
HARDWOODS—		
Maple Flooring, 13/16x2¼ in., Clear	$96.75	$91.75
Oak Flooring, ⅜x1 and 2 in., Clear Qtr. White	110.00	110.00
RED CEDAR—		
Siding, ½x6, Clear	$41.00	$41.00
Shingles, Clears	4.06	4.16
COMMON BRICK—		
Per M. f. o. b. job	$17.00	$17.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers	$2.50	$2.50
STRUCTURAL STEEL—		
Cents per pound to large buyers	2.475	2.325
CRUSHED STONE (cu. yd.)—		
¾ in.	$2.60	$1.825
1½ in.	2.60	1.825
WALL BOARD—		
Per 1,000 sq. ft. in lots under M.	$57.50	$57.50
Per 1,000 sq. ft. in lots 1 M to 2½ M.	52.50	52.50
SAND AND GRAVEL (cu. yd.)—		
Sand	$1.50	$0.95
¾ in. gravel	1.50	0.95
1½ in. gravel	1.45	0.90
(Following prices are F.O.B. factory.)		
FACE BRICK—		
Harvards	$41.00	$38.00
Tapestry	30.00	30.00
Caledonian	34.00	26.00
Smooth Grey	35.00	35.50
Fisk Lock	35.50	35.50
SHINGLES (per square)—		
Asphalt single	$6.40	$6.40
Asphalt strip	5.75	5.75
STAINED WOOD—		
16 in. extra clear	$9.75	$9.75
18 in. Eureka	10.50	10.50
18 in. Perfection	11.50	11.50
18 in. Royal	11.40	11.40
24 in. Imperial	12.00	12.00

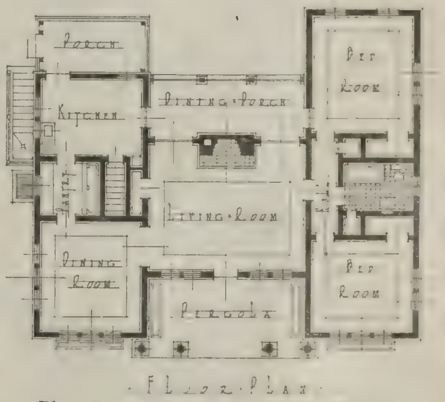
Two Bungalows of Different Types and Exteriors but Planned Almost Alike



Attractive Frame Bungalow with Pergola Covered Porch



Plan Stucco Bungalow Shown Below



Plan Frame Bungalow Shown Above

IT is often interesting to see how a slightly different cement of an exterior will produce an entirely different house, although the plan itself may be practically the same. Illustrated with this article are two attractive five-room bungalows in Terre Haute, Ind., designed by Johnson, Miller & Miller, Architects. The plan of one is very much similar to that of the other, with the exception that one is right hand and the other left hand and that a slight change has been made in the front porch, and other minor details. The general arrangement of rooms, however, is the same and yet, to look at the photographs of these two bungalows one would never suspect that they had anything in comon.

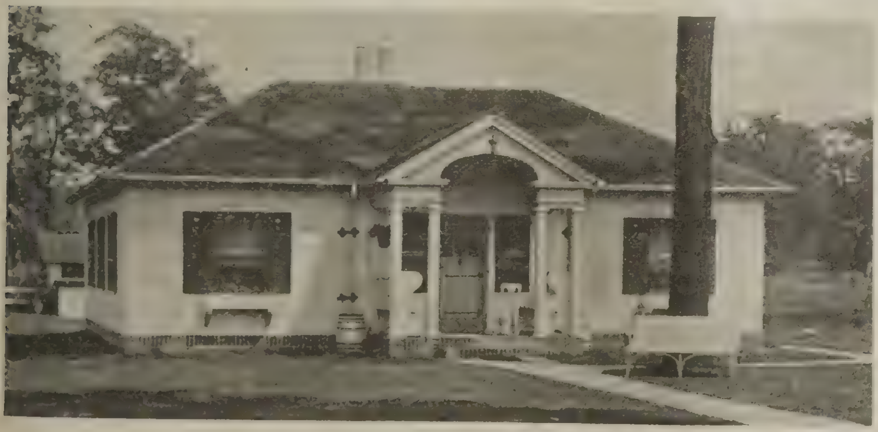
In each case the central room of the house has a large living room opening directly on to the front porch and with a large open fireplace opposite the front door. In the case of the frame bungalow French doors on either side of the fireplace open on to a dining porch. The front porch has been set back into the house and the pergola covering the porch permits adequate lighting of the living room through the front windows.

In the case of the stucco bungalow the front porch has been treated in the usual manner, namely, more or less as an addition to rather than a subtraction from the house. The entrance, however, is unusual and exceedingly well done, with its tapestry brick steps and facing porch seats. The proportions of the whole are good. Instead of the dining porch, the area on the opposite side of the house contains a pool.

On the left hand side of the stucco house are two bedrooms with a bath between. The front bedroom communicates directly with the bath, while the rear bedroom communicates with a very small hall leading into the bath and into the living room. There is also a door between the front bedroom and the living room.

The bedrooms in the frame bungalow are on the right hand side of the house and the layout is only slightly different. A door from the living room leads directly into a connecting hall between the front and back bedrooms. There is also a door between the back bedroom and the dining porch. The front room on the opposite side of the house in each case is the dining room and communicates directly with the living room. In the case of the stucco bungalow a door from the dining room leads directly into the kitchen and another door from the kitchen leads into the pantry, out on to the porch or down into the cellar.

In the case of the frame bungalow the kitchen and dining rooms are separated by the pantry.



The Simple Exterior of This Stucco Type Is Also Effective

Finish and Care of Hardwood Floors

BY A. ASHMUM KELLY

THERE are many woods used for flooring, and the finishes used in their treatment are varied. Floors are made to walk on and not simply for ornament. Beautiful, indeed, as many are, the finish must be capable of sustaining hard wear, and still remain beautiful. If your house is being built, and you are going to have some fine floors in it, let the painter have ample time for doing the work on the floors right. He cannot do this unless allowed ample time for the work to dry and harden before use.

Hard maple flooring makes a handsome and very durable floor, being especially suitable for bed rooms. Shellac varnish, the white or bleached variety, is the proper filler and finish, because it does not mar the natural color of the wood, and gives a good surface for wear. Never put oil on this wood, unless you wish it to become dark. Two or three coats of white shellac, rubbed down, will do, but it should be rubbed once or twice a month with a polishing oil. Cold raw linseed oil for a hard maple porch floor, well rubbed in, has been found to wear well.

An oak floor requires a paste filling to fill up the open pores of the wood. This paste filler is well rubbed into the wood, and when dry is well sandpapered, to make a perfect surface for the finish. You may apply wax on this filling or floor varnish, or both varnish and wax. One fine oak floor was finished with only wax. It was first made smooth with sandpaper, and the sandpapering was continued until the wood shone like a polish. Then it was waxed and rubbed. In the olden days the floor was oiled and waxed, but never was stained. The years imparted a rare dark hue to the wood that was truly beautiful. It is thought by some that waxing on the bare wood will give the best results, but it is probably safer to first fill the wood.

Hard pine makes an ideal floor for rooms that are much in use, like the kitchen, etc. The quartered pine is best; it shows the edge of the grain, and this gives a better wearing floor than the flat sawed wood. The hard pine floor may be paste filled, to fill some of its oft soft parts, or it may be rubbed with stained or clear raw linseed oil. Stain the oil with burnt umber for a dark effect, or with raw sienna slightly darkened with umber for a lighter hue. Or the clear oil if the natural color of the wood is desired. Of course the wood will become darker in time owing to the oil. The oil, plain or colored, should be well rubbed in, and the applications repeated until the wood will take no more. This will give a floor capable of withstanding the hardest kind of wear, and by occasionally renovating it with oil, well rubbed in and surplus oil wiped off clean, it will improve in looks with age. A mixture of raw oil, japan driers and a little turpentine, makes a good first coating, to be followed with paste filler, for the soft parts, and thickening the filler with silica to form a putty for the cracks, making it to match color of finish. Finish with floor varnish if desired, though varnish is not quite satisfactory on hard pine, not wearing well. Shellac does better, and this may be waxed if preferred.

The thinner the coating on a floor the better will it wear. Shellac should be applied quite thin, nearly as fluid as alcohol, with which it is mixed. Wax is a thin coating but can hardly be considered durable. Water affects it, causing white marks. Sometimes the wax is coated with a protective liquid, such as a mixture of good copal varnish, six parts, boiled linseed oil six parts, and turpentine ten parts, well mixed. This is applied in a thin coating, and dries without luster, so that the wax finish effect is preserved.

A soft wood floor needs to be varnished in order to give it a harder surface. It may be stained first, then shellaced or filled with liquid filler.

Parquetry floors are usually finished with shellac, because this will preserve or not injure the natural color of the wood.

Wax is very soft, but may be made harder by the addition of some paraffine wax. Such a composition will make rubbing to a polish easier. Wax of any kind is thinned with turpentine.

Never use water, benzine or naphtha on a waxed floor. If you wish to remove a wax coating, rub it off with turpentine.

A newly waxed floor should be left over night to dry, before polishing it. An old floor may be polished as soon as done waxing it.

It is not advised to use wax finish on bath rooms, entrance halls or kitchens. Varnish is better for such floors. Mention is made of a floor, in a home where an average sized family was raised, that was varnished 27 years ago, and is still in good condition. It was frequently gone over with skim milk, well rubbed in. Varnished floors are advised for public places, such as hospitals, office buildings, stores, etc., and should be wiped up occasionally with milk. Yet there are said to be floors in France that have keen waxed and kept waxed and polished for 200 years, and are so lustrous that the furniture standing on them are reflected as by a mirror. The floors of the Lyon hospital are coated with paraffin made quite thin with petroleum.

Whatever its demerits, it is certain that wax is more popular as a finish for floors than any other material. Other finishes may be adulterated, but wax is pure; it is easy to prepare and to apply or bring to a polish. But to get the best results with it you must use it only in thin coats and rub, rub, rub, until you are tired, and then some more. Be sure to spread it evenly, as well as thinly. Some use a woolen cloth, others prefer a weighted brush, while a small box, covered on its bottom side with Brussels carpet, and containing some bricks, makes a good polishing machine. Or you may nail stiff bristled scrub brushes to the box.

New floors are usually in good shape for the finish, but old floors may need a lot of preparing. Spots or stains must be removed, using strong sal soda water, or perhaps oxalic acid may be needed. This acid is a strong poison and must be used with caution. Dissolve in six quarts of water one pound of oxalic acid. The water should be applied hot. It may be necessary to repeat the application two or more times. In a very bad case try a strong solution of chloride of lime, following this with oxalic acid. Bleaching out a stain will likely cause the part to appear much lighter than any of the surrounding parts, hence it may be necessary to either bleach the whole surface, or stain the floor, making an even surface. If it is thought necessary to bleach out the entire floor, you do not need to make the acid water so strong. After bleaching follow with an application of vinegar, before applying oil or wax finish. Otherwise any remaining acid will eat the wax, or cause white patches to appear in time.

A waxed floor is slippery, hence if desirable a waxed dancing floor may have its wax removed for the dance. and afterwards be re-waxed. The wear on a dance floor that has been waxed is considerable, but for that reason wax is the best finish, it may so easily be restored.

To remove old wax from a floor use a bunch of No. 1 steel wool, dip it into turpentine and wipe off the old wax; clean up with cotton waste as you proceed with the steel wool.

To keep a waxed floor in good condition, go over it once or twice a week with a mixture of turpentine, sweet oil and vinegar in equal parts, using a soft cloth. Follow with a polishing with a soft cloth, which may be wrapped around a floor brush if you like, for convenience.

An old floor that has been oiled but now looks black and unsightly may be restored by removal of the old stuff with a varnish remover, after which apply a strong oxalic acid water or bleaching powder (chloride of lime).

If a varnished floor needs revarnishing first try it with a little linseed oil, applying the oil to any shoe nail marks, or any scratches, and if these marks disappear you may apply a coat of varnish. But if the oil fails to hide the marks, sandpaper the marks and when they are removed apply the varnish. The floor may be revarnished or the scratched parts be done.

A floor cleaned up for renovation seldom wears as well as when first finished. This fact may be due to the presence of some of the substances used in removing the old stuff. After you have cleaned up the floor with a remover go over it with some strong sal soda water, to remove the remover clear down to the wood. However, with all care exercised, it is almost impossible to secure as good a finish as you had when the floor was new. It pays to keep the finished floor in good condition, polishing or cleaning it off every six months, wiping it frequently with a soft cloth. Oiled mops are fine. Remove mud stains with water and soap and a rag. Be careful to not use too much soap.

Lighting Farm Buildings

(*Continued from page* 44.)

highest efficiency at a temperature of 70 degrees, which also removes all danger of freezing. The solution should never be allowed to go above 110 degrees and will freeze at 20 degrees above zero when the battery is fully discharged. When fully charged, freezing will not take place until the temperature falls to 60 degrees below zero.

Tearing Down Old Buildings

(*Continued from page* 47)

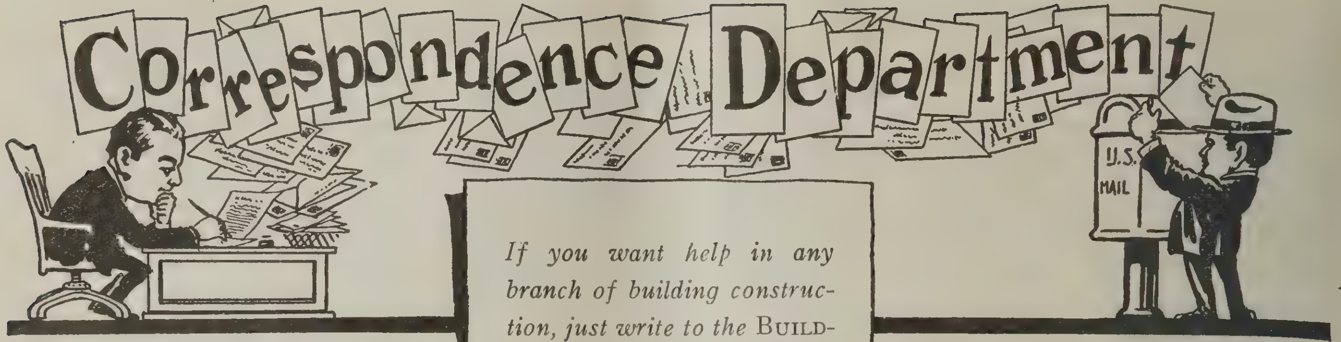
As each story is wrecked, the derrick is lowered one story if for a wall-bearing construction and two stories if for steel frame building, as the columns are 2-story columns. As the wrecking reaches the story over the hoister, a covering is installed over same so the arches can be dropped or demolished. All buildings are wrecked to the sidewalk level and the basement left to what is called "broom clean."

The leading exponent of this type of wrecking in 15 years' experience of tall building demolition, on the most crowded thoroughfares, has never seriously injured a pedestrian.

Drawn by W. G. Farr

How the Building Looked to the Builder Who Didn't Get the Job

—*Judge.*



If you want help in any branch of building construction, just write to the BUILDING AGE *Correspondence Department. We will be glad to answer all your questions without charge.*

All readers are invited to discuss the questions and answers published.

Renovating Piazza and Porch Floors

A VERY simple expedient which may be followed by owners in repairing or renewing old, rotted or decayed piazza or porch flooring, is to take up sections of the old flooring of 2 or 3 feet in width and turn the pieces end for end, cutting off and out all the soft rotted or decayed parts.

Generally the outer ends outside the railings and balusters are rotted, owing to the capillary action retaining the rain or wash water at the outer rounded ends. Shrinkage and opening of the joints also admits dampness. It will usually be found that weather injures the wood mostly at the outer ends. If the flooring, therefore, be carefully lifted with a curved-end bar, and old nails broken off, or punched out, the edges cleaned and the bad portions sawed off, most of the old sound stuff can be relaid again having the tongued and grooved joints coated with a thick white lead paint. Outside the rail the outer ends the joints ought to be well puttied before painting, to exclude water lodging in them. On account of the wood being old and well seasoned the shrinkage will be negligible. The loss in spoiled pieces should not be more than 5 per cent. and new material must be obtained to make up this deficiency. This operation is economical and will make the flooring last at least ten more years. It's worth trying anyway.

Owen B. Maginnis.

A No-Form Culvert

MORE than one-half the time usually required for making a small culvert is consumed in the construction of the forms. Added to this is the extra cost of the lumber when it is not available in the form of old or scrap material. So that the average small culvert sometimes becomes a rather costly affair.

By means of the sketches one may make a good substantial culvert of medium dimensions without the use of any forms whatever. In Fig. 1 is shown the appearance of the ditch to be bridged. Fig. 2 shows the same ditch after it has been filled with earth, well tamped, and crowned. This crown should be one-fifth the width of the ditch. If the ditch is five feet wide, then this crown should be at least one foot higher than the sides.

Trenches are then dug, carefully at each side five or six inches wide, or even wider, and the crown shaped as shown in the section in Fig. 3. With woven wire for reinforcing the trenches are filled with a rich concrete mortar and laid directly on the earth crown. If some old building or news paper is handy this may be laid in double sheets over the crown to prevent unnecessary unevennesses when finished.

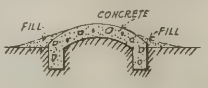


FIG.3 - Ditch Culvert Made

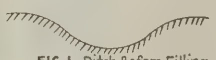


FIG.1 - Ditch Before Filling

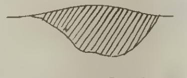


FIG II - Ditch Filled Preparatory to the Trenching

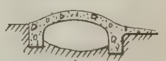


FIG.4 - Finished Culvert

Fig. 4 shows the finished culvert after the earth has been removed from underneath. If the concrete mortar is mixed rather dry, it can be easily moulded up the edges.

Dale R. Van Horn,
Lincoln, Nebraska.

Method of Taking Off Quantities

WILL the readers of BUILDING AGE kindly advise a quick and sure method by which a builder, in taking off estimates from plans or otherwise, can get at the actual cost of the labor on the work.

The method of saving the lumber in a building will cost $1,000; that to do the carpenter work will cost $1,000, is not a system that gets the job and other ways seem like guesswork. It seems to me that there should be a way to figure it out in this fashion:

6 rafters @ $50 M.=$5.00.
6 rafters framing labor=? Hours at ? =
6 rafters erecting labor=? Hours at ? =
6 rafters total cost=â

Then you could take the scale price and make sure work of figuring. I find I am sitting idle letting work get away from me because I bid too high and this seems to be my fault. Would appreciate what you can give me on this matter G. C. B., Derry, Pa.

G. C. B. is referred to an article by I. P. Hicks on page 48 of August issue which may help him.—**Editor.**

Thatched Roofs

Can "thatched roof" effects be obtained with asphalt shingles as well as with wood shingles?—*G. C. B., Montreal, Canada.*

Building Houses with Discarded Munition Boxes

While the housing famine is of international character and the wise economists and would-be experts are as numerous as patent medicines, there are few countries where the solution of this problem is fraught with so many difficulties as it is in Germany through the exigencies of the lost war. Owing to the extraordinary depreciation of the German currency, such building activity as there is applies to cottages and one or two family houses for the well-to-do only except, perhaps, the so-called "Siedlangen" or settlements near towns and cities built with large subsidies by the state or municipalities. Such Siedlungen, while sometimes going a long way towards relieving the local house shortage, are of course, nothing but the proverbial drop on the hot stone and hardly enter into consideration as a weighty factor in grappling with the problem on a larger scale. To house

Putting Munition Boxes in Place

the millions that are waiting for rooms, three or four story flats are required in Germany but with the present cost of material and labor and, above all, the legally fixed maximum rents (amounting to pre-war rates plus 30 to 50 per cent.), he would be a bold man indeed, who would dare to invest capital in building flats nowadays.

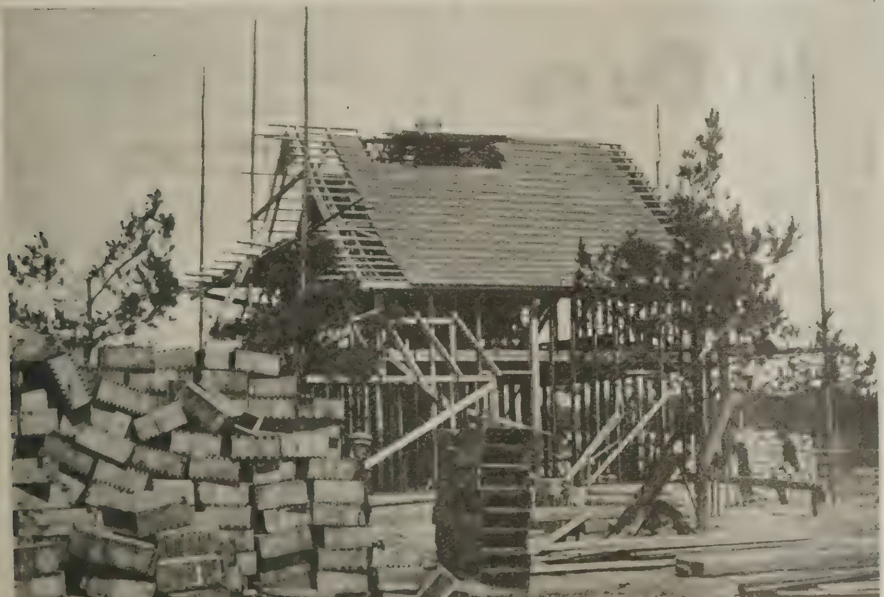
The enormous cost in materials referred to has naturally given rise to a flood of "Sparmaterialen"—saving devices in shape of artificial stones, substitute materials, etc., designed or at least claimed, to lower building costs and has also had a stimulating effect upon the inventive genius of builders and engineers. Novel designs have been springing up during the past two years and one of the most unique methods met with in house building, is depicted in the accompanied photograph. It shows a two family "Siedlungs" house at Hegermuehle, some 30 miles to the north of Berlin, with ——— munition boxes taking the place of bricks and slabs. As may be seen, a specially designed framework has been put up into which the boxes are being built after having been impregnated with carbolineum and filled with a mixture of cement and slag. A heap of discarded munition boxes is shown in the foreground. Fig. 2 shows a close-up view of the house under construction, the laborer inserting empty boxes for demonstration purposes. It is claimed that quite satisfactory results have been obtained so far.

HAVE you ever used any machinery or device which has saved you time and money? Have you ever invented any way of doing a piece of work quicker?

If you have BUILDING AGE wants your experience, and will pay regular space rate for it.

Your description should tell just how you saved time and money, either by a special way of using machinery or by short cuts in construction. Point out what methods you were using before adopting your "Time Saver" and show how your new method turns the trick. You can submit as many articles as you want.

Address The Editor, BUILDING AGE, 920 Broadway, New York City.



Houses to Be Built with Munition Boxes

Preventing Decay of Porch Columns

ONE sometimes fails to understand the cause of premature failing of porch posts and columns. When a house is built, it is supposed that the posts which support the roof of the porch will stand rigid duty as long as any member of the structure. Then, when they begin to loosen at the base and a rot becomes noticeable, the cause is often laid to the lumber itself.

As a rule the blame should lie wholly on the carpenter. The decay of porch posts at the base is due to rot incurred by water drawn into the joint at the bottom by capilliary action. This happens every time it rains and when the floor is flushed off. In June BUILDING AGE it was said that, if the bottom of the column is allowed to rest on a square of sheet iron, so that there is no contact between the floor and the column, this trouble will be reduced because there is no contact between the post and the floor.

A still better way is to coat the bottom of the post with tar or a bituminous solution. When painted this will not show. If the porch floor is of concrete, a good plan will be to raise that portion or portions of the floor upon which the posts are to rest, about one-half inch and neatly work down the collar so that its appearance does not detract. When this is still wet, a bolt without a head is set in the concrete and later a hole bored in the bottom of the post to fit over the bolt. This slight rise will quickly run the water off. *D. V. H.*

Each Stove Should Have a Chimney

TO make the chimney draw properly, each stove should have a chimney by itself. Many times unjust blame is placed on a chimney because it fails to function properly. As a rule the fault lies with the number of flues leading to it. A man recently complained to me of a poor chimney. Upon examination it was found that the same chimney served both the kitchen cook stove and the furnace.

Chimneys should be built according to the location on the roof, size of stove and the arrangement of the flues. It is not advisable to alter a chimney more then one-half its width from a true vertical line. To do so not only weakens the shaft but materially effects the draft of the flue. The top of the chimney should extend above the highest point of the house roof, or the point which is highest on a nearby building, if close. Ordinarily a flue eight by eight inches will serve ordinary purposes but the furnace will be found to perform its duties better if this size is increased to eight by twelve inches. *D. H.*

How to Use Photographs in Advertising

Practical Ideas Which the Up-to-date Builder Can Use to Land Jobs

THERE is nothing which livens up an advertisement so much as does a picture. The contractor who has photographs taken of all his jobs as they are completed enjoys an advantage over the one who does not.

These photographs may be used in newspaper ads and they may be mounted in an attractively bound scrap book. A good binding will cost from five to ten dollars, but it lends an air of quality to the photograph that is worth far more than the cost of the book. With residential work it is a good idea to show plans drawn on a small scale and mounted on the page facing the photographs. This makes a valuable book to show a client or to take out when trying to land a contract. If it is possible to secure a letter stating the satisfaction the owner had with the job, it may be put in the book and the record will be complete.

Such testimonials of past work are one of the best and cheapest advertising mediums any builder can have. The average small town photographer charges from $2.00 to $5.00 for a 5 x 7 photograph. His charge will be nearer the $2.00 figure if he knows he can sell extra prints to the owner of the building, and perhaps another one to the architect. Suggest this extra business to the photographer if he wants to charge more than $2.00.

Send a photograph and short write-up to the editor of your local newspaper as a matter of news. The news item may catch the reader who misses your advertisement. Publicity like this will build prestige, if properly followed up.

Photographs can be used in connection with the usual newspaper advertising. Having the element of news, they make better ads than the ordinary type layout, and will tie up well with your other publicity. It is an excellent idea to have a large number of prints made which should cost about ten cents each, and send them to live prospects. The plan of the Ferro Concrete Construction Company described on page 22 of the August issue of BUILDING AGE is a good one.

To reproduce photographs, it is necessary to make what is called a halftone. The photographs on this page of BUILDING AGE look much better than they would in a newspaper, as newsprint will not take a halftone well. If you run photographs in a newspaper they should be either a 65 or an 85 line screen, as it is called. Any screen higher than an 85 should not be used in newspaper work. For illustrating buildings in the average newspaper, probably an 85 screen would be best. Such a halftone will show up well if the contrast between light and dark on the photograph is strong. If the photograph is monotonous in color, a good newspaper halftone cannot generally be had. Instruct the photographer, therefore, to take the picture on a sunny day so that the contrast be-

Home of R. Wise, Built by Jones

Honest Construction

IT is in hidden construction where unscrupulous builders are apt to skimp. Such defects do not show up until months or years later, when plaster cracks, rotted sills, imperfect valleys, damp cellars, etc., cause trouble and expense. There is only one way to surely avoid such defects. That is to employ a contractor of known integrity, whose reputation has been built up by a long series of satisfactory building operations. That contractor is

Jones, the Builder
Watsonville, N. Y.

New Home of Mr. and Mrs. E. Jackson

40 Days

ON June 1, Mr. Edward Jackson decided that immediately after his wedding to Miss May Worth, he would take his bride to her own new home at 13 Walker Street. That afternoon the happy couple asked Jones to do the job. Construction was started June 10. On July 20, just forty days after excavation was begun, the bride and groom moved into their own new home. That is just one example of the dependability of

Jones, the Builder
Watsonville, N. Y.

tween light and shadow will be as strong as possible. The cut in Fig. 4 is not as good as the other three for newspaper work, those in Figs. 1 and 3 being more suitable.

Line cuts are better than halftones for newspaper work. All the floor plans in this issue are line cuts; photographs of houses are halftones. If you can get hold of a pen and ink drawing of the building from the architect, it will reproduce as a line cut and show up better.

Home of J. Wilkins, Built by Jones

Homelike

What makes a house "comfy"? It is the care used by the builder in the selection and use of the materials. The final result shows a touch of quiet harmony that is the real spirit of the home.

Pride in the little yet important things, is characteristic of the work of

Jones, the Builder

Watsonville, N. Y.

Of course a photograph always looks more authentic than a drawing and for that reason is preferable, if the photograph has sufficient contrast to make a good newspaper halftone.

In Fig. 1 is shown the usual conventional layout where a photograph is used. The treatment here is a dignified one easy for the printer, and certain to look well. But it is so conventional that everybody does it. That is an excellent reason why the builder seeking individuality in his advertisements should follow another style.

In Figs. 2, 3 and 4 are shown layouts that depart from the usual. They are full of individuality and will attract more attention than will Fig. 1. Cut them out, lay them among ads in your local paper and you will see this for yourself.

The copy and layout of all these four ads is interchangeable and show the possibilities of laying out the ad in different ways. Note how in the high narrow ads the type is also high and narrow. Such type is called condensed. In the square ads, the type is medium, or can be what is called extended, *e. g.* wide of face or wider than it is high. Thus the kind of type corresponds to the dimensions of the ad space itself.

One mistake that is too often made is the lack of appreciation of the value of white space. Just because a builder is buying and paying for three or four inches does not mean that these three or four inches must be crowded up with type and pictures. Ordinarily in looking at the printed page one naturally expects to see type, and the eye is immediately attracted toward a space where there is no type. This is the reason why an advertisement with a short and snappy story, which is surrounded with plenty of white space is read, while the ad that is no different from the rest of the printed page is apt to go unnoticed.

A Disappearing Kitchen Range

THE spreading idea of doing all of one's living in one room has reached the point where a disappearing range has been found desirable. By eliminating dining rooms, the objection of having a meal in a hot room where cooking has been going on had to be overcome. Builders are now asked to put the range in a little alcove that may be shut off by closed doors when the family sits down to dine, thus confining the warm air, or permitting it to escape by a small window or ventilator at the back of the little recess. One of the features of construction is the utilization of some of the surplus heat to warm the room above by means of a register. The stove pipe is run up several feet above the register, to prevent smoke or soot from pouring out through it.

Home of John Blank, 17 State St., Built by Jones

Satisfaction

SATISFACTION for the client and for us is certain to result when a job is done by a firm like ours. Satisfaction for the client—because he has a home that is well built and with no defects in the construction. Satisfaction for us—because we have made another friend who is glad to recommend our work. **That** is our aim in every job we do. And that is why, when satisfaction is wanted, particular people see

Jones, the Builder

Watsonville, N. Y.

Building Age Questionnaire Indicates Small Towns Require 60% of Houses Needed in Country

Eight Times as Many Apartments Needed by Towns Under 25,000 As by Larger Cities

ONE of the most interesting facts revealed by the recent questionnaire sent by BUILDING AGE to 1,000 Chambers of Commerce in all sections of the country, is the vastly greater amount of construction needed by towns under 25,000 inhabitant than by the larger cities of the United States. In the smaller class of cities mentioned the returns from this questionnaire indicate a shortage of 822,905 houses. Compared with this the larger cities of the country need 319,528 houses. This means that the expenditure in the next few years to relieve the housing situation in the country will be nearly five times as great in the smaller cities than in their larger neighbors, and that, great as the shortage is in the large towns, the chief demand for building construction will be in the smaller cities for many years to come.

The second most interesting fact learned in this investigation is the demand for the small town apartment house. The returns from the questionnaire indicate that 18,967 apartment houses were needed in the cities under 25,000 population, while there was a shortage in cities over 25,000 population of 2,582 apartment houses. In the smaller towns such apartments will, in many cases, devote the first story to small stores and will provide for from four to eight families above. It was also surprising to learn that many towns of from 10,000 to 12,000 inhabitants exprsssed a real need for one or more apartment houses costing over $100,000.

Of course, the greatest need in the country today is for houses, 1,142,433 being required to relieve the immediate shortage at an estimated expenditure of $4,067,889,500. This figure represents about two-thirds of the total cost of all classes of structures required in all communities. And of this figure, cities under 25,000 inhabitants require an expenditure nearly three times as great as the larger cities. A few cities, 12% to be exact, report housing situation normal, *i. e.*, no houses required. In almost every case this is the cause of special local conditions, where excess construction was undertaken to meet war needs that are now no longer present, and where industrial depression caused the removal of workers, and where there has been unprecedented building activity in the last year.

	Cities over 25,000		Cities under 25,000	
	No.	Total cost	No.	Total cost
Houses	84,674	$380,439,200	28,693	$102,873,000
Apartment houses	906	25,866,000	675	23,028,000
Schools	164	26,690,000	175	24,844,000
Office buildings	70	18,498,000	70	17,130,000
Miscellaneous structures	224	25,624,336	450	21,686,400

Judging from the data secured by BUILDING AGE from the various Chambers of Commerce there is every indication to believe that the Spring of 1922 will see the long-heralded building boom well under way. Not one of the answers received puts the real building activity for any locality further off than April, 1922, while many of them scheduled it for the late Fall, and some even earlier.

The tables following this article contain the latest and most authoritative information on the building needs of the country. All the information presented was secured direct from the secretaries of the Chambers of Commerce, who secured the data at the special request of BUILDING AGE from the most reliable local sources.

Answers were received from 290 cities in every part of the United States. One hundred of these cities have a population of 25,000 or over; the remaining 190 have a population of less than 25,000 inhabitants.

To classify this information properly and to arrive at a figure representing shortage for the entire country, the following method was used.

In the United States there are 285 cities of over 25,000 inhabitants, which cities have a population of approximately 45,289,600. The total population of the 100 cities of this class which answered the questionnaire was 15,439,970, or approximately 35% of the total population in the United States of this class of cities. We assume, for purposes of this questionnaire, that the construction needed by the 100 cities reporting is 35% of the total construction needed in that class. The same method was applied to cities of under 25,000 inhabitants.

The following table gives a summary of the details of the replies received. From this data the shortage for the entire country was figured by the method explained above. In the table below totals for the entire country are given.

BUILDING CONSTRUCTION REQUIRED IN THE UNITED STATES.
Based on Information Furnished Building Age July, 1921, by Chambers of Commerce of 290 Cities.

CITIES OVER 25,000 POPULATION

	Total cost
Houses: 319,528 needed	$2,025,501,000
Apartment Houses: 2,582 needed	64,296,000
Schools: 457 needed	74,491,000
Office Buildings: 200 needed	52,851,400
Miscellaneous Buildings, such as hospitals, hotels, garages, factories, etc.: 628 needed	71,867,692
Total expenditure to relieve present shortage	$2,289,007,092

CITIES UNDER 25,000 POPULATION

	Total cost
Houses: 822,905 needed	$3,080,588,500
Apartment Houses: 18,967 needed	644,878,000
Schools: 4,917 needed	698,214,000
Office Buildings: 4,412 needed	480,908,000
Miscellaneous Buildings, such as hospitals, hotels, garages, factories, etc.: 12,645 needed	619,389,840
Total expenditure to relieve present shortage	$5,523,978,340

Construction Needed Today in 290 Cities

Answers to Building Age Questionnaires

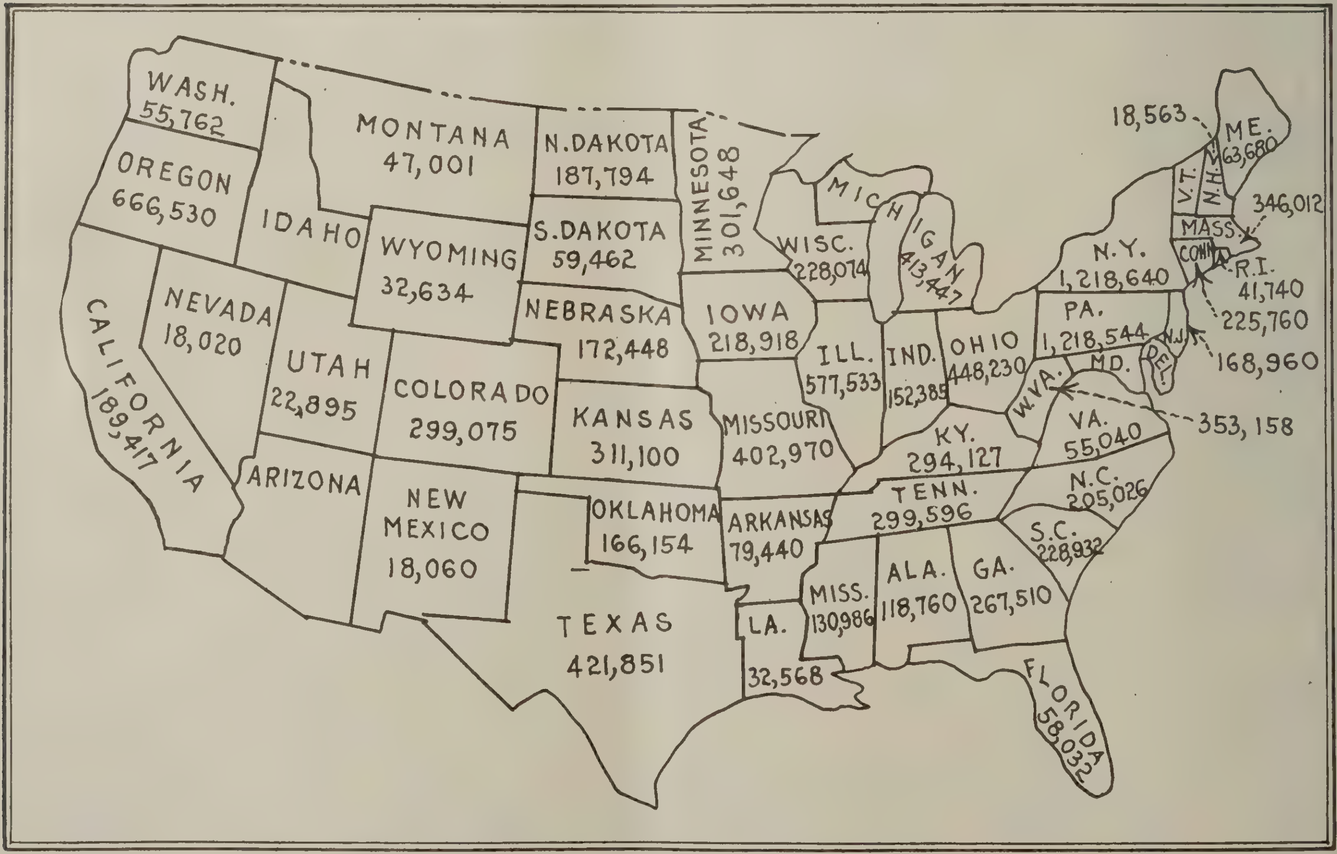
(000 omitted from estimated costs).

	Houses		Apartments		Schools		Office Bldgs.		Municipal		Hospitals		Banks		Garages		Miscellaneous	
	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.
ALABAMA:																		
Anniston	200	$2-10	2	$25-50	..	$200	1	$100	..	..	1	$40	..	..	..	..	..	..
Dothan	200	3	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Montgomery	100	3-5	2	50	5	50 to 100	1	500	..	..	..	..	..	..	..	..	..	..
Selma	100	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tuscaloosa	100	3½	..	4	4	150	..	..	..	..	..	150	2	$150	..	..	..	..
ARKANSAS:																		
Ft. Smith	50+	4-20	3	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
Hot Springs	50	3	..	..	..	..	..	..	1	100	..	..	..	..	..	..	..	..
Helena	150-200	2½-5	3	30	..	..	1	50	..	..	..	..	..	..	..	..	..	..
Texarkana	60	1½ up	2	12	..	..	..	..	..	..	..	..	..	..	2	4½	..	..
CALIFORNIA:																		
Alameda	2,000	3	100	50	2	..	..	..	..	..	..	..	..	..	..	..	1 Hotel	..
Bakersfield	200	3½	10	25	..	..	2	100	..	..	2	..	..	..	..	..	St.	15
Chico	200	4	3	30	1	100	1	100	..	..	..	..	1	100	..	..	St. etc. ?	100
Eureka	50	2	3	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hanford	100	3-5	5	25	2	100	2	150	1	C. H. 150	..	..	..	..	..	..	..	..
Petaluma	45	4½	2	16½	..	..	1	..	1	..	1	..	..	..	..	..	Mem. Com. C.	..
Pomona	250	4	5	60	..	..	..	..	..	..	..	..	..	..	..	..	..	$2,000
Porterville	30	4	..	..	1	400	1	..	..	..	..	..	..	..	..	..	150 R. Hot.	..
Redlands	100	5	2	50	..	..	..	..	..	..	1	250	..	..	..	..	Elks Club	75
																	Hotel	350
Sacramento	500	3½	50	10	..	..	3	150	1	400	2	500	2	300	..	..	5	50
San Francisco	500	4½	..	..	10	250	..	..	..	..	..	..	..	..	20	35	..	..
San Jose	200	5	2-3	35	..	..	..	..	Civ. Aud.	250	1	100	..	..	..	..	..	..
Santa Ana	..	..	..	..	..	..	..	..	..	..	1	250	..	..	..	..	St. Rm.	50
Santa Rosa	150	3	2	40	3	125	1	200	..	..	1	100	..	..	..	..	Hotel	200
Vallejo	1,000	3½	5	50	..	..	3	75	1	..	2	100	2	..	..	..	Hotel	300
Visalia	100	2-3½	25	..	..	110	1	100-200	Fed	..	1	100	1	..	..	..	..	..
DELAWARE:																		
Wilmington	1,500	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Pub. Lib.	500
CONNECTICUT:																		
Bridgeport	..	..	..	..	..	2,000	..	..	City Hall	..	..	..	..	..	..	..	..	..
Thompsonville	100	5	..	..	2	500	..	..	1	100	1	200	1	50	..	..	2 Fac.	200
Willimantic	50	3	..	..	..	..	10	..	..	..	..	..	..	..	..	..	..	..
COLORADO:																		
Boulder	50	3½	6	30	1	500	..	..	2	250	..	..	..	..	..	..	Hotel	150
Canon City	50	3½-4½	3	15-25	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Denver	..	..	..	..	..	..	..	..	..	..	..	..	3	50	4	20	10	15
La Junta	1,400	3	4	20	7	60	4	25	1	75	3	40	..	..	..	..	25 Stores	50
Sterling	50	3½	1	30	..	..	1	75	1	75	..	..	..	..	..	..	..	..
FLORIDA:																		
Jacksonville	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pensacola	300	2-8	12	10-20	..	..		..	..	..	..	..	..	..	..	..	..	..
GEORGIA:																		
Albany	50	2½-4	3	10-20	1	35	..	..	..	..	..	..	..	..	..	..	..	..
Atlanta	4,000-5,000	3-5	50	20	8	50	1	150	..	..	2	100	..	..	..	..	..	..
Fitzgerald	50	3	5	10	1	25	..	..	1	5	..	..	1	20	..	..	4	6
KANSAS:																		
Chanute	60	3	..	..	..	..	..	..	..	..	..	..	1	..	..	..	Hotel	250
Hutchinson	200	3	10	20	..	..	1	200	..	..	..	..	..	..	..	..	..	..
Leavenworth	250	8½	15	..	4	40	..	..	1	250	1	300	..	..	..	..	Hot. & Tem.	250
																		each
Topeka	1,000	6	12	40	1	60	4	80	4	50	4	100	1	200	5	35	25	80
Wichita	1,200-2,000	..	..	..	1	800	..	..	..	..	..	..	1	1,200	..	..	2 Theatres	1,300
(4—265,000)																	1 Ind. Pl	500
KENTUCKY:																		
Cadiz	25	1-3	..	..	..	..	..	..	1	60	1	75	..	..	..	..	..	..
Henderson	50	5	2	25	1	75	1	150	..	..	1	30	..	..	..	..	..	..
Hopkinsville	25	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Madisonville	200	3	2	50	1	100	..	..	..	..	1	100	..	..	..	..	..	..
Newton	150	3½-5	6	10	..	..	1	60	..	..	..	..	..	..	..	..	..	..
Salina	200	15-20	..	..	..	..	4-5	..	..	..	..	..	..	..	..	..	..	..
ILLINOIS:																		
Alton	150	..	10	..	2	..	10	..	1	..	1	..	..	..	..	..	..	..
Cairo	100	2½	1	150	1	10	..	..	..	..	..	..	..	..	..	..	..	..
Centralia	200	3-5	..	..	2	100	..	..	1	..	1	150	..	..	..	..	..	..
Danville	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..
Decatur	2,000	3	..	..	Sev.	..	1	..	C. H. 1	..	..	..	..	..	..	..	Sev. Fact.	
Freeport	20	5-15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Creamery	10
Kankakee	1,000	4	25	15	10	60	2	..	..	..	..	..	..	..	..	..	..	..
La Salle	100	4-8	50	..	1	50	25	..	1 Aud.	..	..	..	..	..	..	..	..	..
Mattoon	50	4	5	..	..	..	..	..	..	..	..	..	..	..	..	..	6 Stores	..
Murphysboro	100	4	5	75	1	50	1	75	2	1,000	..	..	1	75	..	..	2	150
Ottawa	100	5	2	10	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Pekin	50	2-5	..	..	2	50	..	..	1	20	Add.	40	..	..	..	..	..	..
Peoria	500	4½	4	30	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Quincy	300	4½	4	100	1	250	..	..	..	..	..	..	..	..	..	..	..	..
Rock Island	400	4½	10	75	..	..	2	1,000	..	..	..	..	..	..	5	20	Hotel	1,500
Springfield	250	2½	6	..	2	..	Sev	..	1	..	..	..	..	..	..	..	..	..
Sterling	200	4½	5	25	2	350	1	100	..	..	..	125	1	100	1	60	Hotel	350
											also	Trust						
INDIANA:																		
Crawfordsville	100	3½	5	2½	2	..	1	..	1	..	1	..	..	..	1	..	3-4	..
Elwood	200	2	4	1	4	100	..	..	..	..	1	150	1	50	..	..	Com. 1	Bar. 50
Franklin	25	..	1	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..
Evansville	2,500	..	..	..	1	..	..	..	Rest Station		2	..	..	..	..	..	..	..
Ft. Wayne	500	3½	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Indianapolis	2,000	7	25	50-100	5	..	5	..	1	..	..	..	..	..	..	..	..	..
Logansport	6	34-36	..	..	..	..	..	..	..	..	1	70	2	80	1	20	1 Hotel	30
																	Warehouse	45
																	Club	45
																	Stores, etc.	
Michigan City	100	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	Stores	..
Muncie	400	1½	10	..	..	..	5	..	..	..	1	..	..	..	..	..	..	..
Terre Haute	200	4	12-15	..	4	400	..	..	1	..	1	..	..	..	..	..	..	..

	Houses		Apartments		Schools		Office Bldgs.		Municipal		Hospitals		Banks		Garages		Miscellaneous	
	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.
IOWA:																		
Iowa Falls	100	4½	2	40	..	..	..	..	1	75	1	1	..	..	..	..	..	..
Council Bluffs	150	..	..	..	1	..	..	..	..	..	1	1	Add.	..	..	..	..	..
Cedar Rapids	500	6	20-30	..	4-5	..	4-5	..	3	..	2	..	2	..	..	..	..	..
Iowa City	300	5	2-4	100	..	..	1-2	..	..	..	..	..	..	..	..	..	..	..
Marshalltown	40	6	..	..	..	..	..	..	..	1	1,250	..	..	..	..	..	1 Hotel	300
Muscatine	200	5	..	..	Add.	50	..	..	..	..	..	..	..	..	..	..	..	..
Boone	100	5	1	150	..	..	..	..	..	1	100	..	..	1	..	..	..	..
Ottuma	47	3½	1	7	1	700	..	..	..	..	..	..	..	..	..	..	..	..
Oskaloose	50	5	2	25	1	..	1	75	..	..	..	..	1	..	..	..	2 Hotels	250
Ft. Dodge	500	4-5	50-75	..	..	..	..	..	..	..	1	500	..	..	..	3-4	Fac.	..
Keokuk	150	3½	20	5	1	500	1	50	1	..	..	..	3	..	12	..	Stock Pavilion	
Clinton	100	4½	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
LOUISIANA:																		
New Orleans	3,000-5,000	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Monroe	100	3	..	..	2	100	..	..	..	..	..	..	..	..	..	..	..	..
MAINE:																		
Biddeford	150	4½	..	..	..	..	..	..	..	..	..	..	150	4½	..	..	..	..
Augusta	100	3	1	100	..	..	..	..	..	..	..	..	100	3	1	100	Fac.	50
Waterville	100	5½	..	..	1	200	..	..	..	..	1	400	2	150	..	..	..	..
MASSACHUSETTS:																		
Attleboro	200	4-7	2	..	3	..	1	..	1	200	1	200	1	300	1	50	..	..
Brockton	300	..	250	..	2	..	..	..	1	..	..	..	..	..	..	..	..	..
Clinton	100	Mod.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Easthampton	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..
Fitchburg	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gardner	53	3½	..	..	3	50	..	..	..	..	..	..	..	..	Priv. only	..	..	..
Greenfield	500	6	..	..	1	500	..	..	..	..	Add.	100	..	..	..	..	..	..
Haverhill	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	100
Leominister	50	8	..	..	1	125	..	..	..	..	..	150	..	..	..	..	..	..
Lowell	100	3	..	..	2	15	..	..	..	..	..	..	..	..	..	..	..	..
Northampton	500	5-6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Peabody	100	5	200	$30 Mo.	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pittsfield	200	3½-4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Taunton	150	5-7½	3-4	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..
Webster	100	6	..	..	1	100	..	..	1	100	1	50	..	..	..	..	..	..
W. Springfield	300	5½	10	30	2	40	1	60	..	..	..	..	..	..	..	..	..	..
MICHIGAN:																		
Alpena	2,500	1½	1	20	10	25	3	40	4	50	1	30	2	75	6	75	..	..
Battle Creek	..	..	10	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Bay City	1,000	3	100	30	..	..	..	..	..	..	2	200	..	..	..	..	..	..
Detroit	5,000	..	..	..	..	20,000	..	..	1	5,000	..	¾ mil.	..	..	..	..	..	..
Jackson	1,000	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kalamazoo	150-200	2-3	9-10	50-80 Mo.	..	2,000	..	..	C. H. 1	..	..	..	..	..	..	..	..	..
Mt. Clemens	25	3½	..	..	1	250	..	..	..	..	..	..	..	..	..	..	..	..
Monroe	30	5	2	15	..	..	1	30	..	..	1	75	..	..	..	..	..	..
Niles	50	2½-3	50	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..
Quosso	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..
Port Huron	150	5	..	..	..	..	2	500	..	..	Add.	250	..	..	..	..	..	..
St. Joseph	200	..	3	..	1	..	3-4	..	..	..	..	..	..	..	3	..	..	..
Saginaw	250	3	1	200	4			..	Lib. 1	82	Add.	515	..	..	400	200	Ch.Bud. Fac,&c.	
Turence City	..	..	..	..	1	275	..	..	..	..	..	..	..	..	..	..	..	..
Ypsilanti	50	..	..	..	..	..	..	..	..	..	1	150	..	..	..	..	..	..
MINNESOTA:																		
Duluth	2,000	7½	2	500	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mankato	100	4½	Sev.	..	1	..	Sev.	..	Armory	..	1	..	..	..	..	..	Hotel	..
Red Wing	50	3	5	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
St. Cloud	100	4	2	50	..	..	1	150	..	..	..	..	..	..	..	..	Warehouses	100
Winona	100	4	2	60	..	..	1	..	..	..	..	..	..	..	..	..	..	..
MISSISSIPPI:																		
Canton	25	3½	..	..	..	..	1	15	1	10	1	10	..	..	..	..	..	..
Cape Girardeau	100	5	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Clarksdale	..	..	1	15-20	..	..	..	..	..	..	1	7½	..	..	..	..	..	..
Columbia	100	6	50	1	1	7½	1	50	..	..	..	..	..	..	..	..	..	..
Corinth	50	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Greenville	50	3-5	1	100	..	..	1	100	..	..	1	250	..	..	..	..	Frat. Lib.	50
Hothenburg	200	4½	..	..	3	100	..	..	1	100	1	300	..	..	..	..	Hotel	350
Laurel	100	1½-3½	4	..	1	100	..	..	..	..	..	..	..	..	..	..	Storage	..
MISSOURI:																		
Mayville	25	2½	..	..	..	..	..	..	1	75	..	..	Enacted	..	1	40	..	..
Navada	100	3	1	..	..	..	..	..	2	..	..	..	Laws	..	..	..	..	..
Carthage	50	3	2	20	..	..	1	75	1	100	1	100	..	..	..	..	Fac.	..
Chillicothe	100	3	..	..	..	..	1	150	1	50	..	..	..	..	..	..	5 Bus. Bldgs.	10
Moberly	300	1½ to 5	1	150	..	..	..	..	1	300	..	..	..	..	..	..	..	..
St. Joseph	300	3 up	300	..	5	..	4	..	3	..	..	..	..	..	..	..	..	..
Popular Bluff	100	2	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
MONTANA:																		
Helena	250	5	10	150	2	200	2	250	2	150	..	..	..	..	..	..	25	..
Bozeman	25	5	40	2½	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Roundup	50	4	2	50	1	75	..	..	..	..	1	..	..	..	..	..	Fact.	100
Hardin	10	4	..	..	1	25	1	40	..	..	..	..	..	..	..	..	..	..
Great Falls	..	4-5	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Independence	200	4	2	..	1	..	1	..	..	..	1	..	..	..	..	..	Hot. Com. H. L.	
Missoula	150	4	50	..	3	60	..	..	1 C. H. & Jail		1	..	..	..	..	..	..	..
Billings	50	4	..	..	..	..	5	25-30	..	..	..	..	..	..	2	..	..	..
NEBRASKA:																		
La Platte	50	3½	..	..	Add. 3	..	..	..	Com. C. H.	..	..	..	..	..	..	..	..	..
Nebraska City	30	3	2	25	1	50	..	..	1	100	1	50	..	..	..	..	..	..
York	25	..	2	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..
Columbus	10	3½	1-2	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..
Alliance	100	4	5	..	2	100	..	..	1	100	..	..	1	50	..	..	5	20-50
Hastings	500	5-7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Carson City	20	2½	2	10	..	..	..	..	..	..	1	25	..	..	..	..	..	..
NEVADA:																		
Reno	100	4	6	75	2	150	4	200	1	400	1	200	..	...	..	..	..	..
NEW HAMPSHIRE:																		
Laconia	50	3½	6	25-50	1	250	1	100	1	100	..	..	..	..	..	..	..	..
Manchester	659	5	5	10	..	..	3	100	..	..	..	..	..	..	2	50	2	..
Dover	25	3	1	50	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Portsmouth	12	3½-4	.	..	..	..	..	..	..	..	..	..	..	..	..	..	Fac.	20

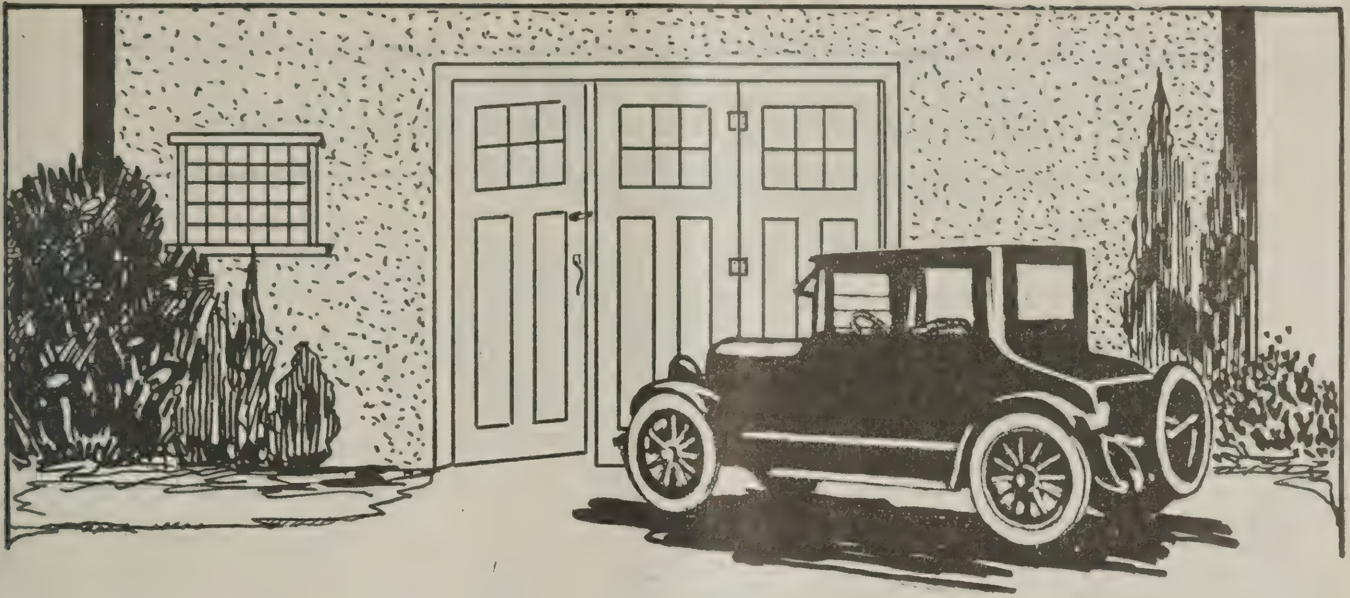
	Houses		Apartments		Schools		Office Bldgs.		Municipal		Hospitals		Banks		Garages		Miscellaneous	
	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.
NEW JERSEY:																		
New Brunswick	200	4	..	..	1	150	..	..	1	250	..	..	..	..	..	..	..	..
Montclair	300	5-7	10	Small	..	..	..	..	..	..	..	..	..	..	..	..	..	..
NEW MEXICO:																		
Santa Fe	100	2½	1	100	..	..	1	100	..	..	..	..	..	..	..	..	..	..
Albuquerque	20	3	4	75	..	..	3	50	..	..	1	100	1	50	25	½	..	..
NEW YORK:																		
Auburn	..	..	2	500	1	500	..	..	..	..	..	..	..	..	..	..	Y.M.C.A.	350
Catskill	35	3½	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
Cooperstown	8	3½-4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Fulton	10	3½-4	3	50-400	..	..	..	..	1	50	1	50	..	..	..	..	..	..
Granville	50	3½-4	..	..	..	..	..	..	1	60	..	..	..	..	1	30	Hot'l	50
Lackawanna	..	..	..	..	1	50	..	..	Sev.	150	Sev.	300	Sev.	75	Sev.	20	..	..
Lyons	25	2½	..	..	1	350	..	..	1	25	..	..	..	..	..	..	..	..
Mt. Vernon	150	..	5	..	..	..	1	..	..	..	..	..	..	..	..	..	10	..
Niagara Falls	2,000	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..
Oneida	50	5	20	100	1	100	..	..	1	C. H.	..	..	..	..	..	..	..	..
Peekskill	45	7½-9	..	..	..	..	..	..	..	..	1	80	1	90	..	..	1	40
Yonkers	Great many	..	..	..	Sev.	..	..	..	..	..	..	..	..	..	..	..	..	..
Tarrytown	150	8	10	40	2	200	..	..	..	..	..	..	..	..	..	..	..	..
Perry	50	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Richmond Hill	1,000	7½	1,000	10	1	500	1	100	..	..	2	1,000	..	..	..	..	..	..
Rochester	5,000	6	20	80	6	100	2	1½ mil.	..	..	..	..	..	..	..	..	..	..
NORTH CAROLINA:																		
Concord	50	3	1	100	..	..	1	150	..	..	..	..	..	..	..	..	5 St.	10
Greensboro	100	5	2	150	..	..	1	..	..	..	Add	..	..	..	..	..	1 Aud.	..
Washington	25	3½	1	15	2	40	1	100	1	200	..	..	..	..	..	..	1 C.H.	100
Wilmington	500	..	2	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..
Rocky Mountain	200	..	..	..	1	..	10	..	..	..	..	..	..	..	..	..	..	..
NORTH DAKOTA:												..	..	..	..	..	..	..
Grand Fork	200	4½	10	50	1	350	..	..	..	..	..	..	..	..	..	..	5	750
Bismark	50	3½	2	20	1	50	1	75	1	50	..	..	..	..	..	..	..	..
Williston	150	3	5	60	1	125	..	100	2	100	1	100	1	25	2	25	5	25
OHIO:																		
Alliance	100	2½-5	..	..	1	50	..	..	..	..	Add.	..	1	100	..	..	..	..
Ashland	250	3-5	5	25	2	50	..	..	1	75	1	50	..	..	..	..	..	..
Barberton	..	..	25	..	..	..	1	..	1	P.O.	..	..	..	..	..	..	Hotel	..
Bellefontaine	100	3½	5	50	..	..	1	200	..	..	..	..	..	..	..	..	C. H.	100
Bucyrus	100	2¼-4	4-5	10-12	..	..	2-3	..	1	500	..	..	..	..	..	..	..	..
Cincinnati	3,000	8	1,000	4	18	..	..	..	..	..	..	..	..	..	..	..	..	..
Dayton	500	5-15	2	150	3	500	2	600	..	..	1	900	2	200	..	..	..	..
Elyria	100	3	3	50	..	..	2	50	..	..	..	..	..	..	..	..	..	..
Hamilton	300	4	60	5	2	200	1	750	1	500	1	500	..	..	..	..	..	..
Lancaster	200	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mansfield	100	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Massillon	250	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Niles	..	..	5	25	1	300	1	100	..	..	1	300	1	200	..	..	..	..
Piqua	50	4	..	..	1	100	..	..	..	..	..	..	..	..	..	..	..	..
Portsmouth	450	3½	4	125	1	200	..	..	1	..	..	..	..	..	..	..	..	..
Ravenna	350	5	5	25	1	350	1	100	1	60	..	..	..	..	..	..	..	..
Springfield	1,500	6-500	1-2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tiffin	100	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Zanesville	100	..	2	..	2	..	1	..	..	..	..	..	..	..	..	..	1	..
OKLAHOMA:																		
Enid	300	3	..	..	2	100	2	400	..	..	..	..	..	..	..	..	..	..
Henryetta	100	3	2	30	..	..	2	100	..	..	1	75	..	..	..	..	Hot	350-400
Poncaleity	50-100	3-6	3	25	2	65	1	..	1	..	..	..	..	..	1	30	10 st.	5-20
Muskogee	300	5	..	..	5	30	1	50	1	150	..	..	..	..	..	..	..	..
Okmulgee	250	3½-4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cowallis	20	2-5	..	..	1	90	1	50	..	..	1	60	..	..	..	..	2	5-20
OREGON:																		
Portland	1,000	3	15	50	15	250	4	250	10	25	4	300	4	400	10	25	5	500
Enjine	200	3	2	100	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Baker	50	4	1	25	..	..	..	..	..	..	..	..	..	..	..	..	Hot.	250
PENNSYLVANIA:																		
Carnegie	150	3½	..	..	1	400	..	..	1	300	1	100	..	..	..	..	..	..
Carlisle	50	3	25	..	1	..	1	..	1	..	..	..	2	..	1	..	5	..
Allentown	1,500	5-15	..	..	6	150	..	..	..	..	..	..	..	..	..	..	..	..
Bradford	50	3½-5	2	40	2	100	1	100	..	..	..	..	..	..	..	..	10	10-25
Bethlehem	500	3½-7	150	1-3½	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Franklin	100	3½	1	100	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Greensburg	100	2-8	2-3	..	..	..	1	..	..	..	..	..	..	..	..	..	..	.
Hazelton	100-200	5-6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
New Brighton	150	5½	8	12	..	..	1	10	..	..	..	..	..	..	..	..	4	4
Punxsutawney	15	2½	2	15	..	..	1	30	1	..	..	..	..	..	..	..	..	..
Phoenixsville	100	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
McKees Rocks	1,000	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Warren	25	5-7½	2	30-40	2	..	..	..	..	..	..	..	..	..	..	..	Hot.	..
Washington	250	4 up	..	..	2	200	1	750	1	250	1	500	..	..	..	..	Hot.	1,250
Tyrone	150	3	50	3	1	75	..	..	..	..	1	50	..	..	..	..	..	..
Wilkes-Barre	1,500	4-6	500	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
York	200	3½	20	20	1	200	..	..	..	..	1	250	1	100	..	..	..	..
RHODE ISLAND:																		
Newport	25	7½	50	6	2	300	..	..	..	..	..	..	..	..	..	..	Hotel	1,000,000
SOUTH CAROLINA:																		
Florence	100	5-10	6	25-100	3	250	2	50-100	1	50	..	..	..	..	6	25-50	H.	500-750
Marion	50	2	..	..	..	..	..	..	..	..	1	20	1	15	..	..	..	..
Orangeburg	30	6	..	..	..	..	1	25	..	..	..	..	..	..	..	..	..	..
Spartansburg	500	5	4-5	100	..	..	1	500	..	..	..	..	..	..	..	..	..	..
SOUTH DAKOTA:																		
Mitchell	50	..	..	..	2	..	..	..	..	..	1	..	..	..	..	..	..	..
Watertown	300	2½	..	..	2	..	1	..	..	..	1	..	..	..	..	..	Aud.	..
TENNESSEE:																		
Clarksville	250	2½	3	20	2	250	3	25	..	..	1	35	..	..	..	..	..	..
Knoxville	600	3	3	60	5	60	1 C.H.	300	..	..	..	300	..	..	..	..	Aud.	500
Marysville	100	3½	..	..	2	10	2	75	..	..	1	75	..	..	..	..	Hotel	50
Memphis	2,000	6-10	5-10	..	..	..	1-2	..	..	..	..	..	..	..	..	..	Hotel	7,500,200
Nashville	1,500	8	20	50	12	40	6	150	..	..	2	500	1	50	6	75		3,600 to1,500,000
Pulaski	25	3	..	..	..	..	..	..	..	..	1	10	..	..	..	..	Creamery	5
																	Laundry	7

NEW JERSEY:	Houses		Apartments		Schools		Office Bldgs.		Municipal		Hospitals		Banks		Garages		Miscellaneous	
	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.	No.	Cost.
Abiline	250	3	5	20	3	100	2	100	2	150	1	100	..	..	..		5 cotton warehouses	25
Austin	200	5-10	50	3	..	..	..	..	..	..	1	100	..	..	..	..	..	..
Amerillo	100	2½	6	50	..	..	..	..	..	..	1	250	..	..	..	..	5 warehouses	25
Brownsville	50	4-6	3-4	25-50	..	..	..	..	..	..	1	75	..	..	..	..	Th. & Aud.	25
Corpus	250	1½	25	15	..	..	..	..	..	..	1	30	..	..	..	..	1	50
Corsicana	100	2½-5	5	25	4	600T	1	300	1	500	1	500	..	..	..	..	Hotel	400
Dallas	1,500	5	500	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
Del Rio	100	3½-4	3	7½	..	..	1	10	..	..	..	..	..	..	..	..	Hotel	250
Denison	200	1½-3½	3	10	4	50	1	150	1	100	..	..	..	..	..	..	..	..
El Paso	..	..	10	100	14	115	..	..	..	..	..	..	..	..	..	..	C. H.	750
Greenville	250	2½	10	7½	2	100	2	500	1	500	..	..	2	250	..	..	..	..
Houston	500	5	50	12½	3	50	1	1 mill	1	150	..	..	2	300	..	..	..	..
Martin	50	5	20	10	..	..	4	10	2	20	..	..	..	..	..	..	..	..
Ranger	500	3½	2	50	2	250T	..	..	1	80	1	60	..	..	..	..	Pos. Sta.	800
Laredo	75	4-5	5	15-20	..	..	..	..	..	..	..	..	..	..	2	15	..	..
San Antonio	300	2	10	15	2	100	1	500	..	..	..	..	..	..	..	..	2 churches	150
Vernon	25	7	1	50	1	250	1	50	1	200	..	..	..	..	..	..	Th.	..
Waco	250	3½	2	..	5	500	1	..	..	..	..	..	..	..	..	..	..	..
UTAH:																		
Ogden	600	4½	10	100	2	200	1	500	1	500	1	300	..	..	5	..	1	1,000
Salt Lake City	100	3½	5	25	..	..	2	250	1	20	1	250	..	..	..	..	..	..
VERMONT:																		
Rutland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VIRGINIA:																		
Newport News	100	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Alexandria	100	5	..	..	1	80	1	..	..	..	..	..	..	..	..	..	Hot.	..
WEST VIRGINIA:																		
Blufield	250	4	15	10-50	..	..	1	250	3	..	1	1,150	1	..	..	..	..	..
Fairmount	400	5-8	..	..	..	..	6	15-40	..	..	..	..	..	..	300	½-1	C. H.	400-1000
WASHINGTON:																		
Billingham	50	3	5	30	2	100	..	...	1	200	1	200	..	..	..	..	..	..
Oylmpia	50	3	..	..	1	40	..	..	..	..	1	350	..	..	..	..	1	25
Spokane	1,000	2-4	5	100	2	250	..	..	..	..	..	..	..	..	..	..	..	..
WISCONSIN:																		
Janesville	..	..	..	..	1	600	1	..	..	..	..	..	1	150	..	..	Aud.	200
Appleton	270	3½	1	..	2	..	2	..	..	..	1	500	..	..	1	..	1	..
Ashland	12	5	..	..	1	..	1	..	..	..	..	..	1	..	..	..	..	..
Fond du Lac	150	4	100	..	2	300	1	150	1	100	..	..	..	..	..	..	..	..
Madison	750-1000	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Milwaukee	..	..	9,000	3	7	250	5	500	8-10	300	4	500	2	500	..	..	..	..
Stevens Pt.	200	4	1	75	1	250	2	..	..	..	1	100	..	..	..	..	..	..
Wankesha	100	3½	..	..	1	50	..	..	..	..	..	..	..	..	..	..	Hot.	400
Wansan	60	..	..	..	1	..	..	..	..	..	1	1,000	..	..	1	..	..	..
WYOMING:																		
Casper	200	3-5	..	..	..	..	..	..	..	..	1	200	..	..	..	..	..	..
Laramie	200	3½	1	75	2	190	1	125	1	200	..	..	..	..	..	..	..	..
Thermopolis	100	3	2	50	..	..	1	150	..	..	..	..	..	..	..	..	Hot.	500



TOTAL CONSTRUCTION NEEDED IN THE VARIOUS STATES.

Figures read thousands of dollars. For example, the figure 421,851 for Texas, means that $421,851,000 worth of building of all kinds is needed in the State of Texas.



PAGE THE BUILDING CONTRACTORS WHO ARE LOOKING AFTER THE HOUSING OF THE

9,300,000 automobiles

now in use in this nation, and you will find a very large percentage of them using

NATIONAL
Nos. 805 and 806
Garage Door Sets

Every necessary and desirable garage hardware feature is incorporated in these handy and popular National sets. Nothing that will contribute to comfort and convenience is lacking.

Here are the qualities you have a right to expect and **find** in a first-class Garage Door Set, and here are the qualities you **do** find in the National:—

- Correct Distribution of Load
- Noiselessness
- No Warping
- Easy Installation
- No Place for Dust to Lodge
- No Friction or Binding
- Smooth Running
- Economy
- Efficiency
- Proper Finish
- Simplicity
- Adjustability
- Adaptability
- Good Appearance

**Ideal arrangement of doors, providing absolutely free and easy access at all times
Hung so that they work as freely as any house door.**

Ask for Garage Plan Booklet "F," and mention dealer's name.

National Manufacturing Company
STERLING ILLINOIS

New Catalogs and Publications

THESE catalogs may be secured direct from the manufacturer. If you prefer, write the date of this issue and the numbers of any catalogs on a postal and mail it to "Building Age," 912-920 Broadway, New York City. The catalogs will be sent you without charge or obligation.

699. **Instantaneous Automatic Water Heaters** are described in a little booklet gotten out by the Rudd Mfg. Co., Pittsburgh, Pa. This booklet illustrates their usefulness in the laundry, kitchen, bathroom, and in the garage, and describes the design and construction in detail.

700. **Combination Gas and Coal Ranges** for the average house are illustrated in a small leaflet of the Richardson & Boynton Co., 260 Fifth Avenue, New York. Another leaflet by the same company describes the Richardson Tank and Laundry Heaters. The purpose of these heaters is to keep water hot at all times. They are coal fired.

701. **Chicago Faucet Company** makes an improved type of mixing faucet which is described in detail in one of their small leaflets. All the wearing parts are easily removable and renewable.

702. **The Eastern Scoop Body** for Ford trucks manufactured by Easton Car Construction Co., New York City, is described in Bulletin No. 32, recently issue. This can be attached or detached in ten minutes. It is designed for use by road builders, gravel pits, sand banks, etc.

703. **Steam and Hot Water Heating System.** The Vesuvius Engineering Co., Inc., New York City, describes in an interesting folder the Vesuvius Heating Unit for houses, industrial buildings, etc. This unit is fired by gas instead of coal, and is designed to give economical heat in the building.

704. **Facts About Painting,** etc., are brought out in the Carter Times, published by the Carter White Lead Co., Chicago, Ill. The latest issue discusses putty and shellac and their proper application.

705. **Natural Color for Floor Tile** in full size samples accompanying a small folder gotten out by the Beaver Tile and Specialty Co., New York City. This tile is laid like parquet floor, is made in eight different colors and lends itself readily of descriptive effects in the home, in the office and in hotels.

706. **Information on concrete construction** is always contained in Alpha Aids, published by the Alpha Portland Cement Co., Chicago, Ill. The 27th issue gives drawings and specifications for floor box and garden seats.

707. **Frost Forms for building concrete** house are described in a leaflet gotten up by the Hollow Concrete Wall Co., Mitchell, South Dakota. These forms are for concrete construction of the double wall type.

708. **Warm Air Furnace.** The Wise Furnace Co., Akron, Ohio, publishes a complete bulletin showing the application of the Simplex Pipeless Furnace to moderate cost house heating. Pamphlet shows the detailed construction of the furnace and gives measurement capacity, etc.

709. **Sidewalk Doors, Coal Hole Covers.** Description and sizes of such contractors and builders' accessories are given in a small pamphlet of the Canton Foundry & Machine Co., Canton, Ohio, profusely illustrated.

710. **"Hot water as much as you please"**—extract in GOOD HOUSEKEEPING, reprinted by B. Ryan Co., New York City, describes the system of Thermostat control for gas water heaters.

711. **Metal Mouldings.** The National Metal Moulding Co., Pittsburgh, Pa., publishes a convenient handbook, "For the Man on the ob," giving sizes and styles and hints on installation and use of electrical moulding conduits and other features. The book contains 102 pages and is well illustrated. It can be conveniently carried and used on the job.

712. **Combined Seat and Foot Bath.** A twelve-page folder of the Wheeling Sanitary Mfg. Co., Wheeling, W. Va., describes a combination bathtub that affects considerable saving of bathroom space. It is particularly adapted to apartments, hotels and small residences. The illustrations show the design and construction of the tub.

713. **Electric Heaters.** Various types of Majestic Electric Heaters are illustrated and described in a ten-page folder of the Majestic Electric Development Co., Philadelphia, Pa.

714. **Wall Board.** Bird & Son, Inc., East Walpole, Mass., are sending out a folder containing full size sample of Neponset Wallboard. It is tough and flexible, and the cream side is finished in such a way that no further exterior finish is required.

715. **Concrete Roofing Tile.** The Walter Concrete Tile is described and illustrated in a reecnt booklet. Its application and method of laying for houses and industrial buildings is shown by many pictures.

716. **Architectural Drawing Plates** is an editors' manual published by the Mahaul Arts Press, Peoria, Ill., and gives complete plates showing standard practice of making working drawings for small house construction.

717. **Brick—How to build and estimate.**

718. **Carbide Gas Generators** describing the construction, design and operation of gas generators for lighting and heating on the farm or where city gas is not available. Twelve-page folder of the J. B. Colt Co., New York City.

719. **Handbook of Standard Details.** A 312-page handbook, 5x7, by Charles M. Hughes, and published by B. Appleton & Co., New York City. A compilation of standard types, dimensions, sizes, weights, etc., of materials and manufactured parts used in construction of machinery and engineering structures. The standards cover fastenings, power transmission, structural details and a large number of miscellaneous parts. Material on standard engineering drawings, and a large number of tables of value to the engineer and designe are included.

720. **The Slide Rule.** A 132-page handbook by C. N. Pickworth, published by Isaac & Sons, New York City. 5x7, explaining the use of slide rule, giving short cuts and illustrating the text by practical examples.

721. **Fire Place Equipment** illustrates mantel piece, fireplaces, equipment and descriptive mantel work are furnished on request by Arthur Todd Hunter, New York City.

722. **Temperature Regulated.** The Fulton Co., Knoxville, Tenn., publishes the temperature regulator chart for use in figuring the proper size of tank regulators. The chart is intended for the use of architects and engineers.

723. **Floor Tile.** Publication No. K-200, prepared by the Associated Tile Manufacturers, Beaver Falls, Pa., describes quality, sizes, and kinds of commercial tiles and manufacture and use.

724. **Water Supply System.** A 64-page catalog of the Ralph B. Carter Co., New York City, describes construction, installation and operating of water supply system for farm and other use.

725. **Hoisting and Pumping Engines.** A 105-page catalog, Novo Engine Co., Lansing, Mich., illustrates the design of the Novo Hoisting, Pumping and Air Compressor Equipment, giving sizes, capacities, etc.

726. **Expanded Metal Construction.** The North Western Expanded Metal Co., Chicago, Ill., publishes monthly a small pamphlet giving approved metal lath construction.

BUILDING AGE

NEW YORK, OCTOBER, 1921

Six-Room House for Small Corner Lot

Dutch Colonial Type Popular in Eastern Suburban Towns

CORNER lots as a rule generally do not run small. Probably it would be more accurate to say that corner houses do not run small, and naturally the land they are built on must be selected to suit. The house of William F. O'Brien, East Orange, N. J., is an exception. It is a beautiful little Dutch Colonial type and is located right on the corner. The overall dimensions of its plan are 29′ 6″ x 41′ 6″. The house naturally fronts the long way of the lot, with a sun parlor toward the corner.

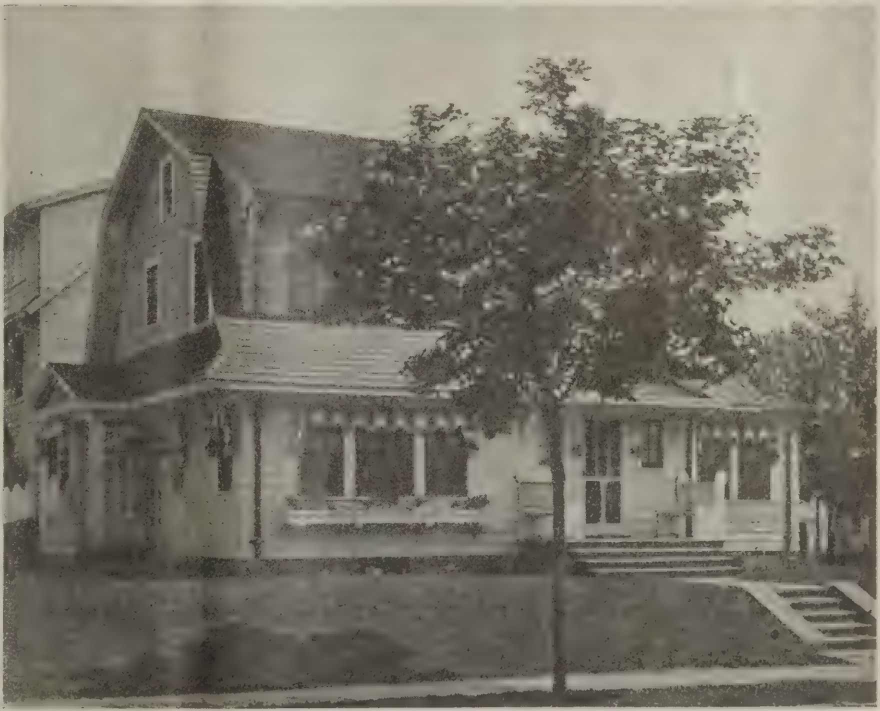
Being of Dutch Colonial design it presents an artistic exterior, although the construction itself is simple and economical. The entrance is particularly pleasing with its two side seats and decorative lights on either side of the door. The windows of the second floor are provided with blinds of the solid type, such as are generally seen on this style of houses.

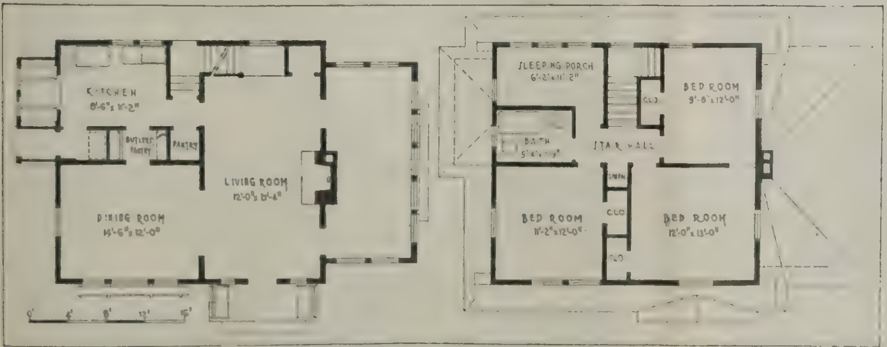
The garage is located at the rear of the lot, the front being nearly flush with the sidewalk. Its construction is simple and economical, being of the flat-roof type with a pergola effect at the eaves.

The house itself, not considering the sun porch, has a nearly square plan (25′ 6″ x 26′ 0″) with a sun porch extending another 9′ 6″, being about 9′ x 20′ in inside dimension.

The first floor provides for a large living room 12′ x 21′, adjacent to the sun porch, and with French doors entering the sun porch on either side of the open fireplace. A colonnade entrance divides the living room and dining room. Between the kitchen and dining room is a small butler's pantry. Off from the kitchen is a breakfast alcove with table, seats and cabinets. The delivery entrance is at the side and leads into the entry.

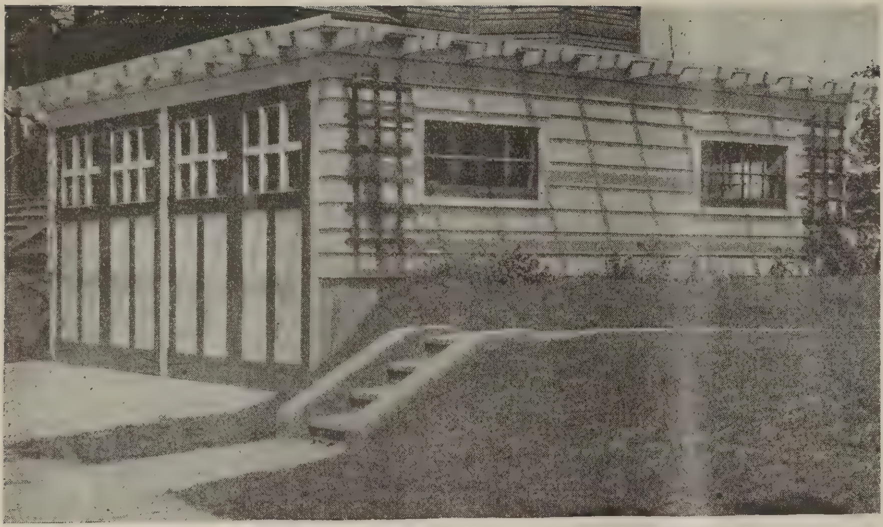
The construction of this house is frame throughout. In most sections of the country it can be duplicated today for about $8,000. This figure does not include land or garage. The rough estimate would be as follows:





House of William F. O'Brien, East Orange, N. J. William E. Garrabrants, Architect

Note square plan and convenient arrangement of rooms.



Flat-Roofed Garage Gives Artistic Appearance

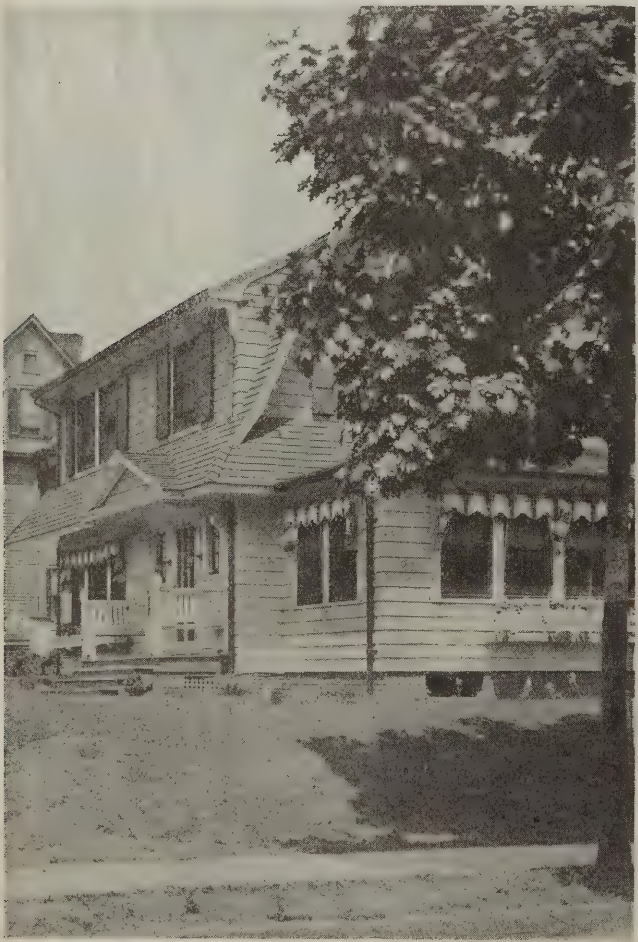
Excavating and grading	$300
Masonry, footings, foundation, chimney, cement work, etc..	650
Lumber, mill work, carpentry work, etc.	4,500
Plastering	400
Hardware	200
Painting, staining, etc.	400
Metal work	200
Plumbing, gas fitting, etc.....	450
Heating	700
Electric wiring and bell work	100
Lighting fixtures...........	150
Extras	100
Total	$8,150

There are a large number of houses of this type being built in the eastern section of the country. No doubt this is due to the fact that it is possible to get a pleasing, artistic house with the atmosphere of the better class of homes, and still maintain economy of construction and design. No doubt this is also possible with other types of houses to a certain extent. We have seen certain little colonial types where economy has been attained to even a greater extent. Notwithstanding this fact, however, the Dutch Colonial house is certainly gaining considerable headway in the small suburban towns of the East.

Building-Material Freights Reduced in Virginia

TO stimulate home construction and road building for the remainder of the year, the railroads of Virginia have agreed to a voluntary reduction in freight rates on sand, gravel, crushed stone and similar material, according to press dispatches from Richmond.

Large 9x20 sun room on this side of the house has eight large windows and is one of the pleasantest rooms of the house.



This view of the entrance detail has an attraction that is hard to resist. Beauty, simplicity and economy are all there.

FOUR ROOM BUNGALOWS WITH THE CONVENIENCE OF SIX ROOMS

Some Recent Los Angeles, Cal., Bungalows.

Space Saving Equipment that Reduces Number of Rooms and Makes it Possible to Build Homes for Less Money

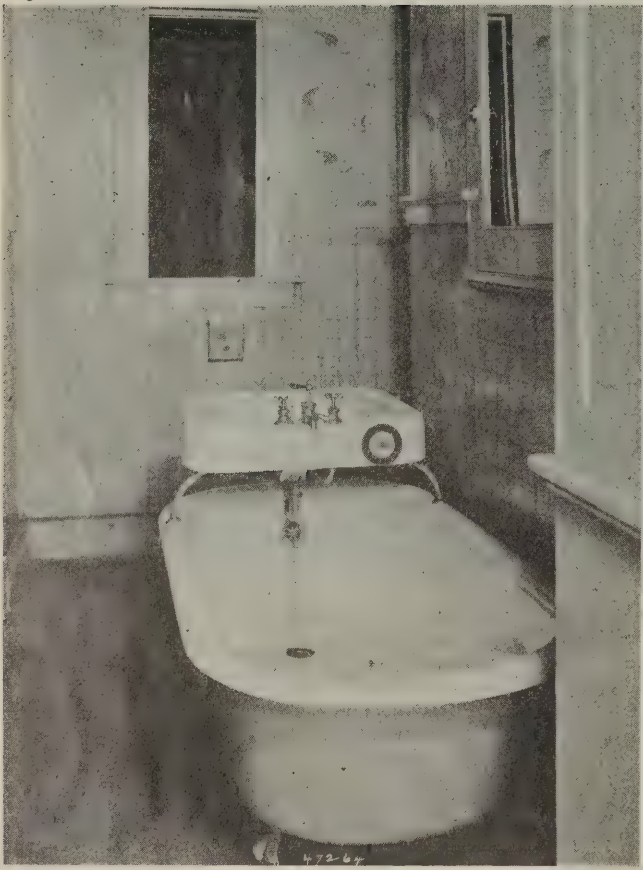
SOME interesting bungalows that have recently been built in California are shown here—interesting because they are equipped with modern space saving devices that have enabled the builder to put up an economically four-room bungalow that has all the advantages of a six-room dwelling.

The floor plan of these houses is identical, although the exteriors have been altered in the matter of entrance, pergolas, roof design, etc., to relieve the monotony. The typical floor plan shows a general layout of the rooms. In some cases this plan has been reversed; that is, the sun parlor has been placed on the left and the living room on the right. The economy of the planning is indicated by the plain rectangular shape, the house being 26 feet wide by 32 feet deep. All of the rooms are corner rooms, with sufficient window space to provide ample cross ventilation and light. The 10′-6″ x 10′-6″ sun parlor is provided with four windows, two on each of the exposed sides. A large 4′ x 7′ closet is built into the house adjacent to the sun parlor and with the doors opening into the parlor and into the hall. This room is designated on the plan as a bedroom and serves the purpose of concealing a collapsible type of bed during the day, as well as a closet for clothes, etc., at night. The sun parlor can readily be converted into a sleeping room by pulling out this bed.

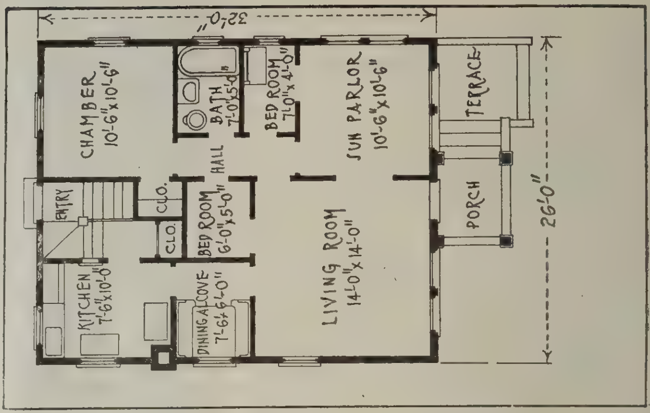
The living room is a large 14′ x 14′ room with two front windows and one side window. The entrance from the porch is directly into this room. A similar bed closet and wardrobe is also provided for this room, making it possible to convert it into a sleeping room at night.

Another feature of this house is the 6′-0″ x 7′-6″ dining alcove which is provided in each. This alcove is adjacent to the kitchen, is large enough for the purpose of a small family, is convenient to the kitchen for the housewife, and is a desirable adjunct in a servantless house. There is no movable furniture in the alcove. The dining table and seats are stock

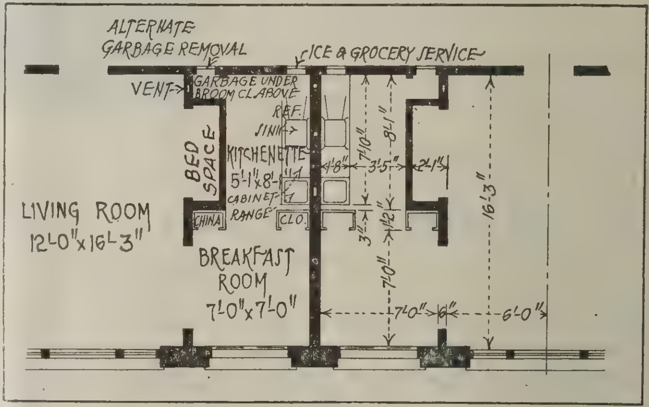
These Bungalows Are Equipped with Well-Arranged Kitchen Furniture.



How Bath-Tub and Wash-Bowl Are Combined to Save Space.



Typical Plan of These Bungalows.



Detail Plan Showing Arrangement of Space-Saving Equipment.

material and are built into the house.

The kitchens of these houses form another interesting example of built-in furniture that make housekeeping a pleasure. Each kitchen is provided with gas range with a hood and electric light directly over the range. Porcelain sink with tile drip-boards and ample drawers on either side give a clean and attractive work table. In the adjacent wall and convenient to the sink and range is a large built-in kitchen cabinet. Broom closets, ironing board closets and the like are another feature of this house.

In the opposite corner of the kitchen is the bed chamber 10′-6″ x 10′-6″. This room serves as the regular sleeping room, while the emergency bedrooms, spoken of above, make it possible to accommodate visitors and provide a children's sleeping room as well.

In the bathrooms there are some interesting space saving plumbing fixtures. For example, a wash bowl superimposed directly over the end of a bathtub makes it possible to save at least a foot and a half or two feet in the length of the bathroom, as well as a small item on the plumbing expense.

The general scheme followed in equipping these houses with space saving equipment and other conveniences is shown in the detailed plan. This plan also provides for a small delivery opening for ice and groceries, and one for garbage removal.

How Do They Do It?

EACH one of the neat, comfortable houses in this row of 20 buildings rents for ten dollars (yes, $10 and *no* cents!) per *month*. And there is a neat chicken house in the rear of each; hot and cold water, bath, etc. It is said that the only complaints so far have been by two or three tenants who wanted garages. The houses are miners' homes in Nanticoke, Pa., near Wilkes-Barre.

Says the awe-stricken photographer: "I can supply affidavits if necessary."

Photo from Underwood & Underwood.

How Progress Charts Reduce Building Costs

System Developed by Successful Contractor to Insure Prompt Deliveries of Material and Shorten Time Required for Construction Saves Money on the Job

By **NOBLE FOSTER HOGGSON**
President, Hoggson Brothers, Building Construction, New York City

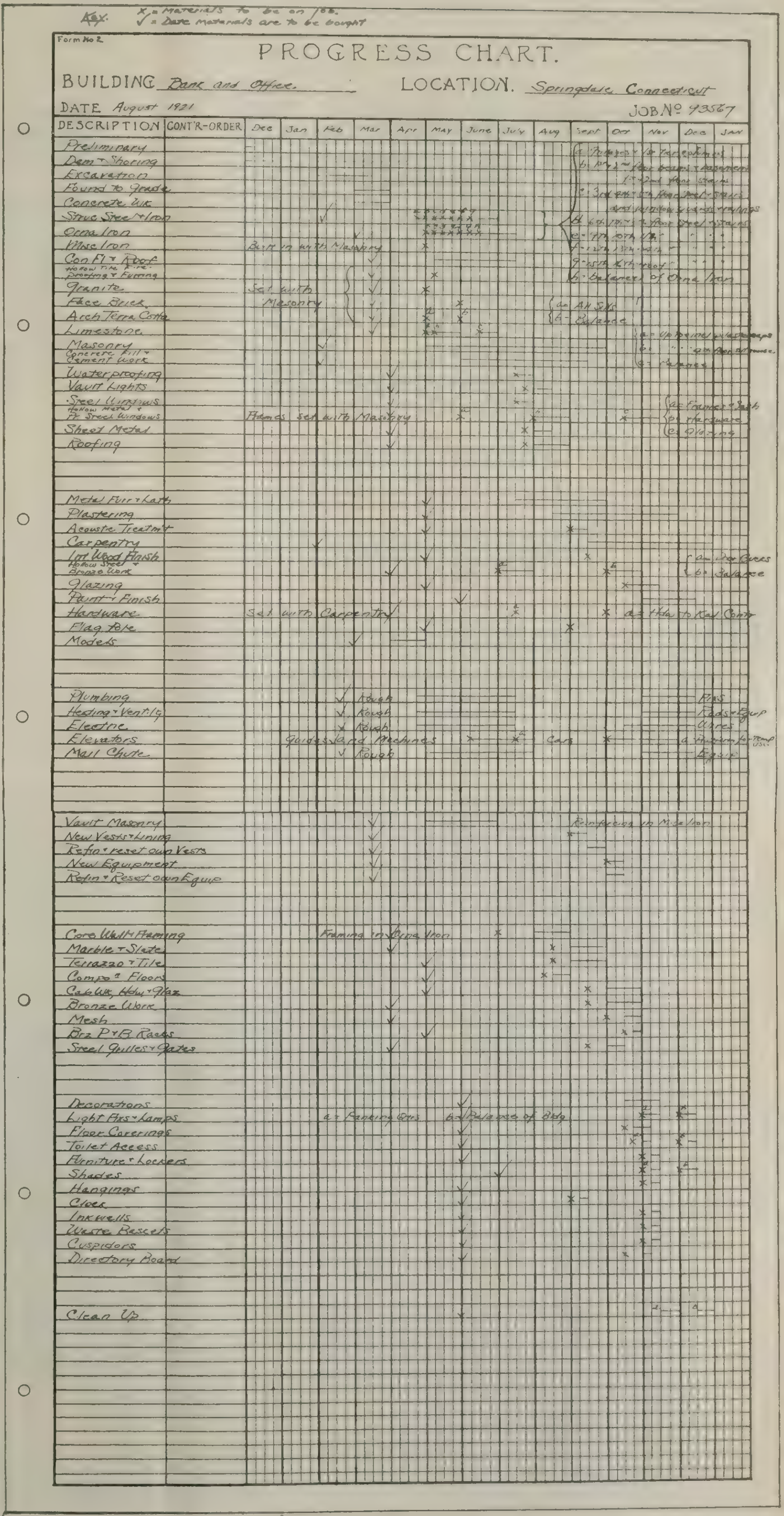
"THE more complex the undertaking the more essential is a schedule," recently said an authority on standardization and simplification in industry. The soundness of this principle is evidenced by the rapidity with which production charts and progress schedules have been introduced in large manufacturing plants and adopted by large corporations, such as the Winchester Repeating Arms Co. and the United States Shipping Board.

The progress chart has likewise had its place in the work of large building concerns and has resulted in such obvious benefits where used that its adoption can be strongly advocated for even the smallest operations. Early in Hoggson Brothers' career the need was felt for some orderly visible method of keeping in touch with the progress of a number of operations all going forward simultaneously. Various forms of charts were experimented with until finally the form shown in the accompanying illustration was adopted as the one most satisfactory from every standpoint. This progress chart is now used for every one of Hoggson Brothers' many building projects—from the smallest alterations to the largest bank and office buildings.

With a progress chart an entire building operation becomes one orderly progression of events, each step anticipated, fully prepared for and falling smoothly into its place after the preceding step—the builder being able to estimate accurately the completion date of the job.

But, most important of all, the greatest advantage of the progress chart is to be found in its money saving feature. Such a method of con-

(Continued on page 55)



Key. X = Materials to be on Job.
√ = Date materials are to be bought

Form No 2

PROGRESS CHART.

BUILDING Bank and Office.
LOCATION. Springdale Connecticut
DATE August 1921
JOB No 93567

DESCRIPTION | CONT'R-ORDER | Dec | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | JAN

Preliminary
Dem + Shoring
Excavation
Found to Grade
Concrete Wk
Struc Steel + Iron
Orna Iron
Misc Iron
Con Fl + Roof
Hollow Tile Fire-proofing + Furring
Granite
Face Brick
Arch Terra Cotta
Limestone
Masonry
Concrete Fill + Cement Work
Waterproofing
Vault Lights
Steel Windows
Hollow Metal + Pr. Steel Windows
Sheet Metal
Roofing

Metal Furr + Lath
Plastering
Acoustic Treatm't
Carpentry
Int Wood Finish
Hollow Steel + Bronze Work
Glazing
Paint + Finish
Hardware
Flag Pole
Models

Plumbing
Heating + Ventilg
Electric
Elevators
Mail Chute

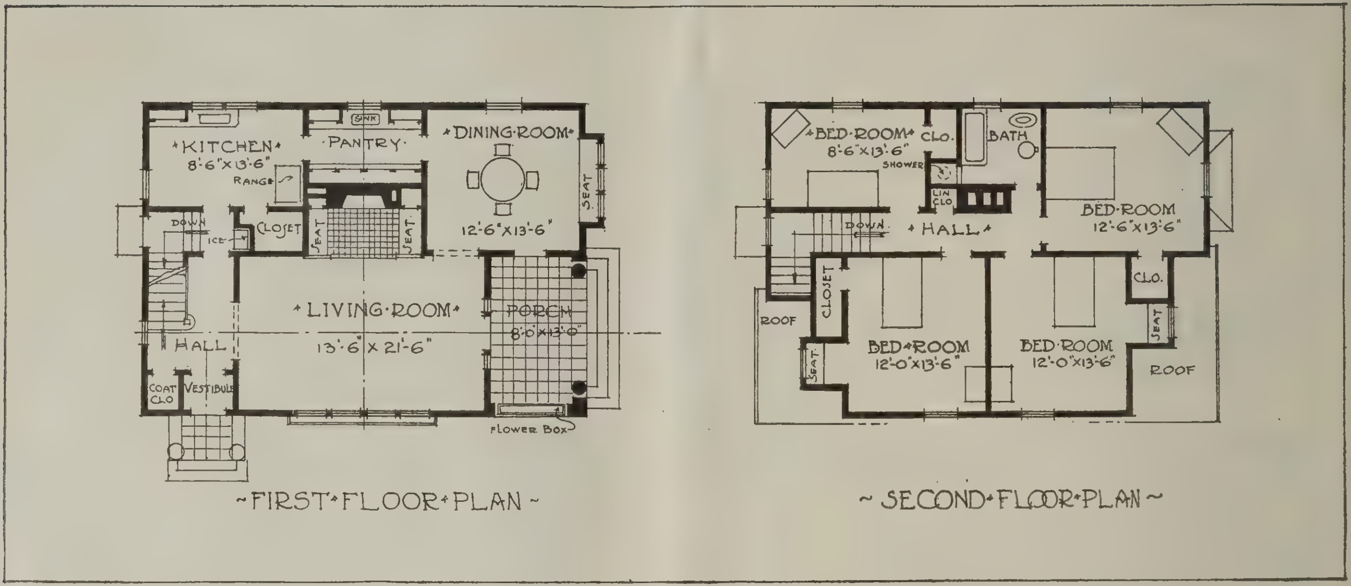
Vault Masonry
New Vests + Lining
Refin + reset own Vests
New Equipment
Refin + Reset own Equip

Core Wall + Framing
Marble + Slate
Terrazzo + Tile
Compo Floors
Cab Wk, Hdw + Glaz
Bronze Work
Mesh
Brz P + B Racks
Steel Grilles + Gates

Decorations
Light Fixs + Lamps
Floor Coverings
Toilet Access
Furniture + Lockers
Shades
Hangings
Clock
Inkwells
Waste Baskets
Cuspidors
Directory Board

Clean Up

Two Well-Planned Moderate-Cost Houses



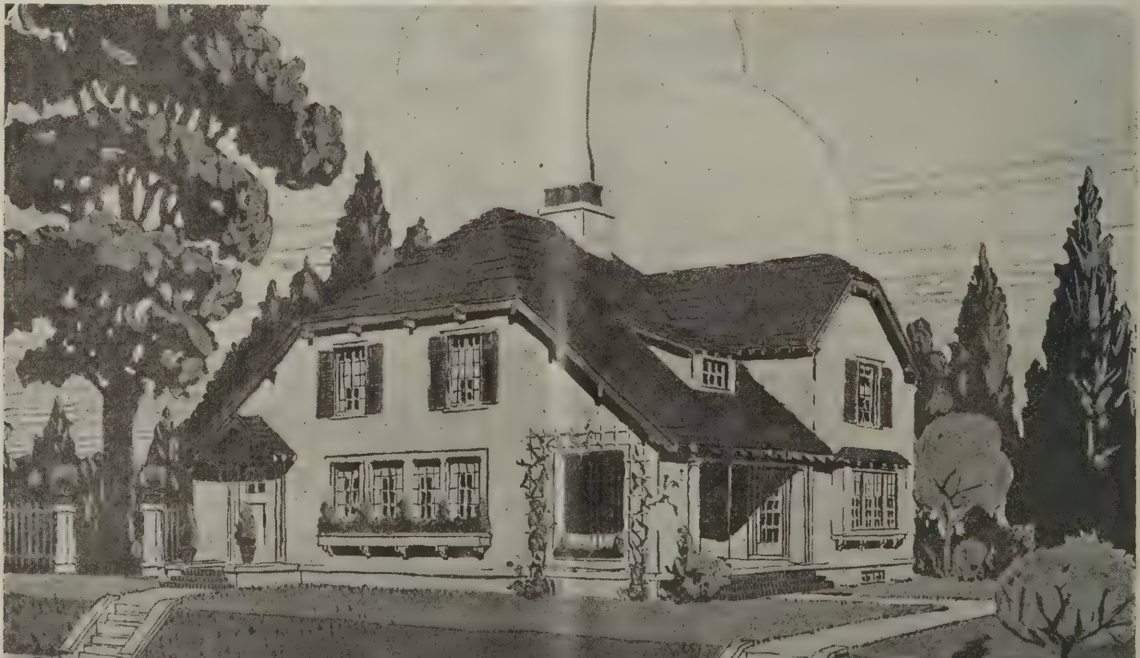
Seven-Room Stucco House — A J. Simberg, Architect

THIS small home will appeal to those who are looking for simplicity in design and excellent arrangement. This design has features that are not always obtainable in the average small house today.

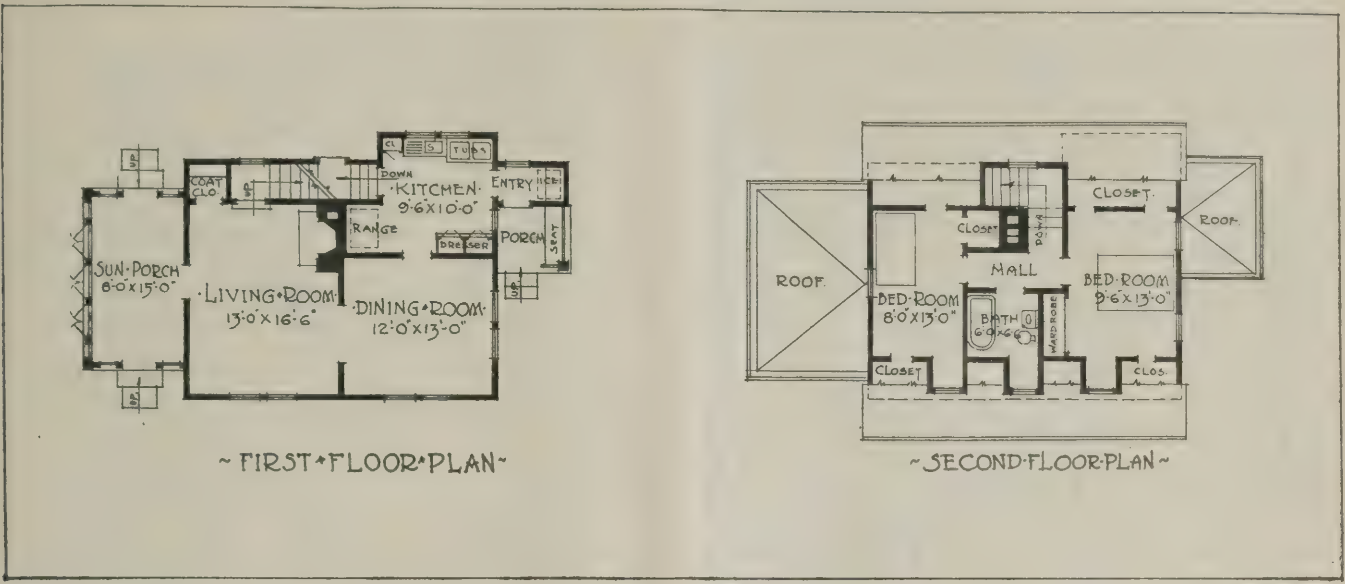
The living portion of the first floor is 75 per cent. of the total space on the floor. The hall space on both floors is a minimum. The size of the building is 28 x 39 feet and the average height 30 feet. This house can be built in most localities for $9,000.

Complete working plans and specifications for either stucco-on-frame or stucco-on-hollow tile will be furnished for a nominal sum.

Quantity survey is on page 26.



Designed for Building Age Readers



~ FIRST·FLOOR·PLAN ~

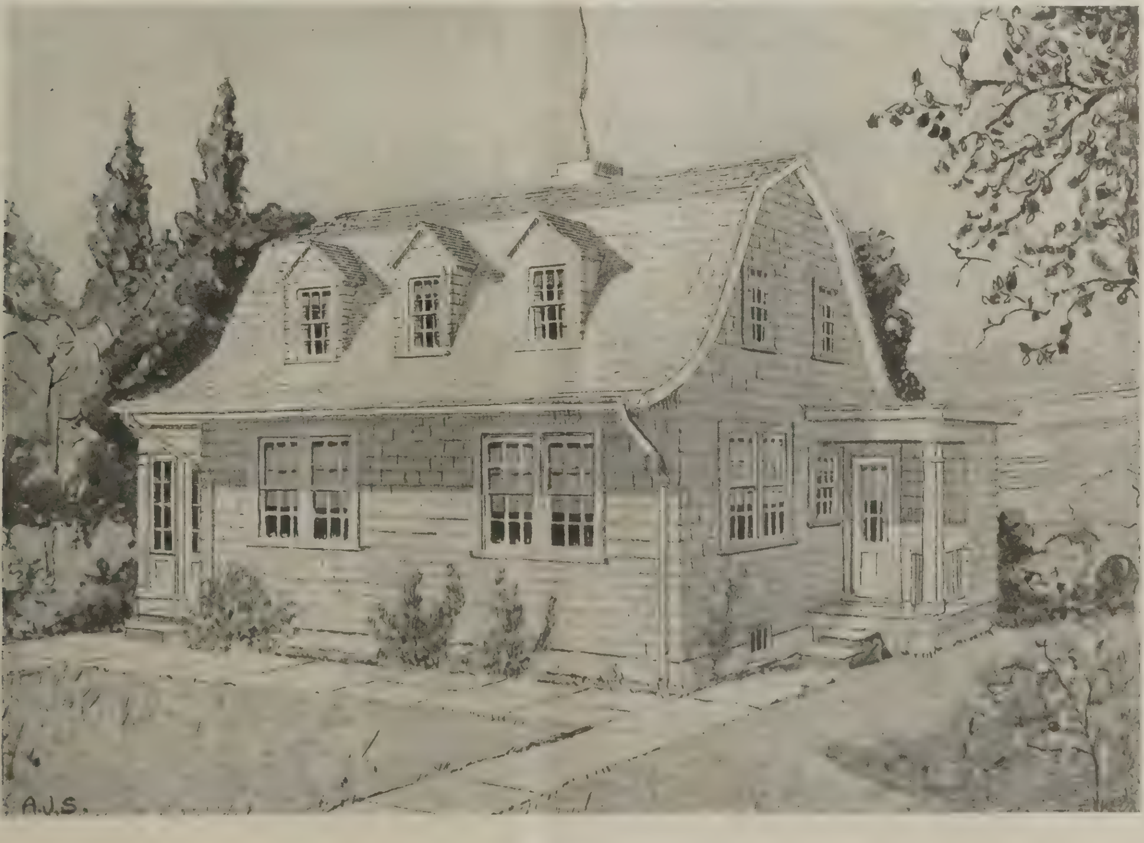
~ SECOND·FLOOR·PLAN ~

Five-Room Frame House—John J. Klaber, Architect

BEAUTIFUL and simple in its exterior, economical in its construction, practical in its design, this frame house offers a real home for the average small family.

No useless hall space on the first floor and 80 per cent. of the second floor for actual living accommodations are features that emphasize the economy of this design. It is difficult to imagine how five large livable rooms could be more compactly assembled within such an attractive yet economical exterior.

Complete working plans and specifications for this little home will be furnished to our readers for a nominal sum. Quantity survey on page 27.



Quantity Surveys

Seven Room House—Stucco on Frame

(*See page 24*)

THE amounts listed here are for purpose of estimating. All measurements are "Net." Amounts for such as sheathing, roofing, etc., are given by area, with no percentage allowed for waste and matching of lumber. Small items have not been listed. These depend on local conditions such as clearing plot, drainer, supplies, etc. Minor outs are disregarded. Where the word "Item" appears in amount column it indicates that expense for material in question should be figured in lump sum.

Loam 15 ft. around site—10″ deep	80 cu. yds.
Excavation for cellar	225 cu. yds.
Excavation for footings, etc.	40 cu. yds.
Concrete foundations; footings, etc.	50 cu. yds.
Forms for foundation (contact area)	2500 sq. ft.
Cement wash, for basement window sills	18 Lin. ft.
Concrete basement floor	92 sq. yds.
Common brick for chimney, fire stops, etc. (334 cu. ft.)	6½ M
9 x 12 flue lining	76 lin. ft.
Thimble piece for 9 x 12 included in flue lining	1
Clean out door and frame in chimney	1
Terra cotta chimney pots	3
Cement chimney cap, 2′-6″ x 4-0″	Item
Cinder fill for porch; rammed	12 cu. yds.
Concrete under body for porch and front entrance	15 sq. yds.
Brick layed on edge in cement mortar for steps to porch and entrance	400
Cement finish and lines at front door and porch floor	120 sq. ft.
Finished fireplace (rough fire place and trimmer arch included in previous item for chimney)	
Damper for 40″ opening	1
Mantel bar (if a patent damper, which forms lintel, is not used)	1
Brick for facing lining, under fire and hearth	260
Tile—6″ square for Liv. room Ingle nook floor	30 sq. ft.
Framing lumber:	
No long length needed; no joist over 14′-0″. Lengths are taken the next whole foot. That is 12′-4″ is taken 13′-0″ the lengths allowed for splices in sills.	
4″ x 6″ sill	280 ft. b.m.
2″ x 10″ joists	950 ft. b. m.
Cross bridging 1′ x 2″ stock	160 lin. ft.
6″ x 10″ y. p. for porch girder	50 ft. b. m.
6″ x 6″ y. p. for porch post to girders in living room	65 ft. b. m.
2″ x 8″ rafters including ridge longest pieces 17′-0″	2000 ft. b. m.
2″ x 8″ porch roof	132 ft. b. m.
2″ x 8″ and miscellaneous for cut off at main roof	35 ft. b. m.
Wall framing; 2″ x 4″s, 12′ o. c. Include in price for plate of 2″ x 4″s doubled usual bracing, etc. No outs taken for windows or doors on account of doubling and trussing	2500 sq. ft.
2″ x 4″ stud partitions with 3″ x 4″ y. p. cap and one row of bridging; lengths measured to girder or partition cap below, and no outs deducted	500 sq. ft.
Non-bearing partitions of 2″ x 4″ and 2″ x 3″ studs; include cap and bridging	1200 sq. ft.
2″ x 10″ for stair framing	140 ft. b. m.
Roof sheathing	2800 sq. ft.
Wall sheathing (diagonal)	3000 sq. ft.
Under flooring (square-edge boards)	1700 sq. ft.
Furr down for sheathed ceiling of porch	100 sq. ft.
Furr for metal lath and stucco columns	2
Roof shingles	20 sq
Ridge; shingles	48 lin. ft.
Flashing under stucco	80 lin. ft.
Gutter; 4½″ metal	85 lin. ft.
Ends for gutters	8
3″ metal leaders	40 lin. ft.
Goosenecks and bands	3
Iron pipe for leader ends	3
Exterior windows (include frame and sash)	
Cellar windows 3-lt., 3′-0″ x 1′-0″	6
2′-0″ x 4′-10″ casement	3
2′-0″ x 3′-6″ casement	1
2′-6″ x 5′-0″ double hung	7
2′-6″ x 4′-0″ double hung	1
2′-6″ x 4′-6″ double hung	6
2′-8″ x 3′-4″ double hung	2
2′-8″ x 4′-10″ double hung	7
2′-10″ x 4′-8″ double hung	2
Fixed sash side lights porch to living-room door 1′-4″ x 4′-0″	2
Panels under	2
Lower and panel shutters for 2nd story windows, cut out design	5 pr.
Exterior doors (include frames)	
Front door 3′-2″ x 7′-0″, glazed	1
Side entrance door 3′-0″ x 6″-8″ glazed, 6 lts. 1 panel under	1
Porch door 2′-8″ x 7′-0″ glazed 18 lts.	2
Exterior finish	
Moulding in soffit of main cornice	60 lin. ft.
Similar for dormer cornice	20 lin. ft.
Brackets for dining room bay	4
Rake moulding for porch	25 lin. ft.
Hoods over front and side entrance, including brackets, etc.	2
Aprons under exterior doors	4
Interior Doors:	
3′-2′ x 7′-0″ glazed	1
2′-6″ x 7′-0″	2
2′-4″ x 7′-0″	1
2′-6″ x 6′-10″	4
2′-6″ x 6′-8″	2
2′-4″ x 6′-6″	4
2′-6″ x 6′-6″ cellar doors	3

Frames for single doors	17
Interior finish:	
4½″ moulded trim, with mitered joints	1200 lin. ft.
Window stools and aprons	70 lin. ft.
Stop beads for sides	180 lin. ft.
Head stops	75 lin. ft.
Seats in bed rooms Nos. 3 and 4	Item
Seats in Ingle nook	Item
Jamb and head for cased openings	40 lin. ft.
Window seat and bay in dining room	Item
Panel moulds over mantel	1 unit
Mantel in living room	1 unit
Book cases at Ingle nook	1 unit
Linen closet; include flat doors and shelving	1 unit
Medicine cabinet in bath room	1 unit
Wardrobes in bed room, doors, shelves and drawers	4 units
Shelves and hook strips for closets	20 lin. ft.
Hanging rods	20 lin. ft.
Dressers in pantry	1 unit
Dressers in kitchen	1 unit
Pantry counter with drawers under	1 unit
Sink frame and counter in kitchen	1 unit
Shelving and cupboard in kitchen pantry	1 unit
Ironing board	1 unit
Picture moulding	470 lin. ft.
Cupboard over ice box	1 unit
Stairs to 2nd floor	
Treads 3′ long with open ends	8
Treads with closed ends	6
Starting treads, curved end	1
Plain risers	16
Starting riser, curved	1
Skirt board	25 lin. ft.
String casing	8 lin. ft.
Stair rail	13 lin. ft.
Newels	1
Handrail on brackets	5 in. ft.
Cellar stairs	
Treads 3′-0″ long	13
Risers	14
Plain handrail	10 lin. ft.
Studing for coal bin partitions	125 sq. ft.
Sheathing for coal bin partition	80 sq. ft.
Building shovel hole and slide	1 unit
Frame for 2 laundry trays	1 unit
Plastering interior (on wood or metal lath)	
Ceilings	210 yds.
Stair soffits	8 yds.
Basement ceiling, plaster-board or plaster)	100 yds.
Walls	Net 600 yds.
Tile floor in bath room and shower	56 sq. ft.
Tile walls (4″ x 4″) in bath room, shower and kitchen (tile carried to ceiling in shower)	130 sq. ft.
Corner beads	60 lin. ft.
Exterior stucco on metal lath and back plastered or on patent wood lath with waterproof backing ("Bishopric")	Net 200 sq. yds.
Stucco for porch columns 8′ 0″ high x 15″ dia.	2

Allow for work not listed in the survey:	
General or overhead costs	Item
Grading walks, planting, etc	Item
Connection for water, sewer, gas, etc	Item
Insert sub-bids for other trades:	
Hardware	Item
Setting hardware	Item
Painting	Item
Plumbing	Item
Heating	
Electric work	
Fixtures	

Same House—Stucco on Hollow Tile

Omit the following materials listed above:

- Common brick for fire stops
- 6″ x 6″ porch post of yellow pine
- Wall framing (2x4s), bridging, trussing, etc.
- Studs 2 x 4 for partitions, caps, plates, girts, etc.
- Non-bearing partitions (2 x 4) 2 x 3)
- Wall sheathing
- Furring for columns
- Roof shingles
- Ridge shingles
- Studing for coal bins
- Sheathing for coal bins
- Wood lath for interior plastering
- Metal lath for exterior stucco

Substitute the following:

Roof: of asbestos shingles or clay tile or cement shingles, or slate	20 sqs.
Outside walls, 8″ hollow tile blocks including full and half closures	2800 sq. ft.
Anchor bolts	30
Bearing walls of 6″ hollow blocks	550 sq. ft.
Non-bearing walls 4″ hollow tile	1200 sq. ft.

Five-Room House—Frame

(*See page* 25)

Strip loam, 12′ around site, loam average 10″ deep	55 cu. yds.
Excavations for cellar	140 cu. yds.
Excavation for footings, piers, etc.	10 cu. yds.
Concrete for foundations	41 cu. yds.
Forms for same (contact area)	2070 sq. ft.
Form trowel wash for basement sills	8 lin. ft.
Concrete basement floor	57 sq. ft.
Common brick for chimney (200 cu. ft.)	4 M
8″ x 12″ flue lining	56 lin. ft.
Thimble piece included above	1
Metal thimble for smoke pipe	1
Clean out door in chimney	1
Concrete chimney cap for 3 flues 3′ 6″ x 2′ 0″ x 8″	Item
Fire stopping 2 M brick	Item
Finished fire place (rough brick and trimmer arch included in previous item for chimney)	
Damper for 36″ opening	1
Mantel bar (unless patent damper is used)	1
Brick for facing lining, under fire and hearth	160

Framing lumber:

There are no long lengths needed

Joists not over 14′ 0″ in length

The next wholefoot is scheduled when listing, that is, a piece 11′ 4″ is counted 12′

Lengths allowed for splices in sills girts, ridge, etc. (framing of balloon type)	
2″ x 8″ sill	133 ft. b. m.
2″ x 6″ sill for porches	56 ft. b. m.
2″ x 10″ joists	1515 ft. b. m.
Cross bridging of 1″ x 2″ stock	85 lin. ft.
2″ x 6″ for porch floor joists	140 ft. b. m.
2″ x 8″ for porch roof and girders	225 ft. b. m.
2″ x 4″ jack rafters and blocking for cornice	170 ft. b. m.
2″ x 6″ rafters including ridge lengths under 12′ 0″	640 ft. b. m.
4″ x 4″ posts in cellar under stairs	2
Wall framing 2″ x 4″,—16″ o. c. Include in price for plate of 2″ x 4″ doubled usual posts, bracing, etc.	
No outs taken for windows or doors	1200 sq. ft.
Cut in 1″ x 5″ ribbon girt with blocking	40 lin. ft.
2″ x 4″ stud partitions, 12″ o. c. with 3″ x 4″ y. p. cap and bridging, lengths measured to girder below, no outs deducted	144 sq. ft.
Non-bearing partitions of 2″ x 4″ and 2″ x 3″ studs, include cap, sole and bridging	400 sq. ft.
2″ x 10″ and smaller stock for stairs	140 sq. ft.
Porch roof sheathing	213 sq. ft.
1″ x 2″ blocking	200 sq. ft.
Wall sheathing and boarding	1914 sq. ft.
Under flooring, square edged boards	910 sq. ft.
Frame suspended ceiling 1″ x 6″, 16″ o. c. with hangers from rafters	260 sq. ft.
Dormer cornice	40 lin. ft.
Moulding at gambrel angle	30 lin. ft.
Rake moulding for gable and dormers	100 lin. ft.
Main cornice and gable moulding	96 lin. ft.
Cornice for porches	63 lin. ft.
Bed mould	36 lin. ft.
Sheathing for porch ceilings	225 sq. ft.
Column for porches	3
Rail for porches	6 lin. ft.
Panels, moulding and pilaster for sun porch ⅞″ stock	70 lin. ft.
Flooring for porches	190 sq. ft.
Shingles and sheathing paper	1000 sq. ft.
Apron pieces under thresholds	3
Interior Doors:	
3′ 0″ x 7′ 0″	1
2′ 6″ x 6′ 6″	8
2′ 0″ x 4′ 0″	5
5′ 0″ x 7′ 0″ French casement doors	2
5′ 0″ x 5′ 6″ Wardrobe doors	1
Frames for single doors	17
Interior Finish:	
4½″ x ⅞″ moulded trim with mitered corners	400 lin. ft.
Plain casings for kitchen, closets, etc., butt joints	300 lin. ft.
Strap furr ceilings and rafters with 1″ x 2″	500 sq. ft.
Shingles for roof	13 sqs.
Shingle ridge	29 lin. ft.
Tin roof for porches	2½ sqs.
Flashing for dormers	100 lin. ft.
Flashing around chimney	10 lin. ft.
Flashing window heads, etc.	50 lin. ft.
4″ metal gutter	60 lin. ft.
Ends for same	4
Metal leaders	55 lin. ft.
Goosenecks & bends	4
Iron pipe for leader ends	4
Exterior windows (include sash and frame):	
Basement windows 2′ 4″ x 1′ 6″ hinged	2
2′ 8″ x 5′ 0″ D. H.	6
2′ 8″ x 4′ 0″ D. H.	2
2′ 4″ x 3′ 4″ D. H.	8
2′ 0″ x 3′ 4″ D. H.	2
3′ 0″ x 5′ 0″ D. H.	3
1′ 6″ x 5′ 0″ Fixed	6
Exterior doors (include frames):	
Porch door (kitchen) 2′ 6″ x 7′ 0″ glazed with 9 lts. 2 panels under	1
Sun porch door 3′ 0″ x 7′ 0″ glazed 9 lights 2 panels under	2
Rear door 2′ 6″ x 7′ 0″ glazed 9 lights 2 P. under	1
Exterior finish:	
Window, stools and aprons	50 lin. ft.
Base	200 lin. ft.
Mantel in living room	1 unit
Coat closet, case door shelf and hook strip	Item
Arch between living room and stairs	Item
Shelves for 2nd story closets	20 lin. ft.
Hanging poles	20 lin. ft.
Medicine closet in bathroom	Item
Wardrobe in bedroom No. 1	Item
Closet shelves and dresser in kitchen	Item
Sink frame, drain board and case under	Item
Case over Ice Box	Item
Picture moulding	200 lin. ft.
Stairs to 2nd floor:	
Treads about 3′ 0″ long	13
Special treads at foot and top	2
Risers	14
Skirt board	24 lin. ft.
Hand rail on brackets	12 lin. ft.
Starts	2
Finished floors, including sheathing paper	650 sq. ft.
Cellar stairs:	
Treads 3′ 0″ long	11
Risers	12
Plain rail	10 lin. ft.
Studding for coal bin partition	126 sq. ft.
Sheathing on coal bin partition	126 sq. ft.
Build shovel hole & slide	1 unit
Frames for 2 wash tubs in kitchen	1 unit
Plastering interior (on wood or metal lath):	
Ceilings in general	100 yds.
Basement ceiling (plaster board or plaster)	50 yds.
Walls, net	320 yds
Corner beads	120 lin. ft.
Tile floor in bath room	45 sq. ft.
Tile walls in bathroom 3′ 6″ high (3″ x 10″)	70 sq. ft.

Allow for work not listed in above and insert sub-bids for other trades, same as for 7-Room House.

Safe Sewage Disposal for Country Dwellings

System of Septic Tank, Siphon and Filtration Field That Prevents Bad Odors and Contamination of Water

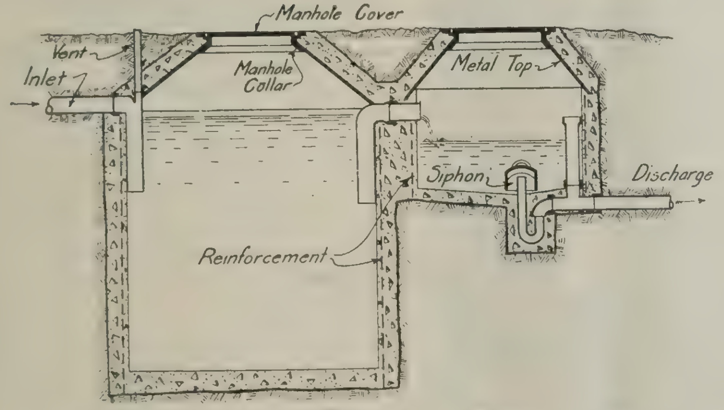
MANY buildings are so situated that they cannot make connections to sewers and must resort to individual systems of sewage disposal in order to provide the sanitation and comfort that is possible with modern plumbing layouts. Such is particularly true of farm buildings, suburban dwellings and the like. The principle of the septic tank and its use in this connection has received considerable attention in recent years and its present stage of development permits of its use in connection with a modern plumbing system and factors without the unsanitary features of a cesspool or the danger of contaminating the drinking water.

In general it will be said that domestic sewage consists of water to which has been added the solids from human waste and washings from kitchen and bathtub. These solids are rich in bacteria which isn't used up by the dissolved oxygen naturally found in the water. The decomposition caused by their action results in obnoxious odors. Harmful bacteria are generally present in the sewage, and if it is accessible to flies or contaminates the water, there is danger from disease. The problem of sewage disposal is to eliminate the solids and bacteria, and to clarify the sewage and prevent obnoxious odors.

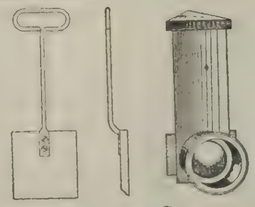
Experience has indicated the best

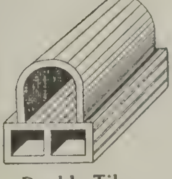
Data for Design of Type "A" System for Residences

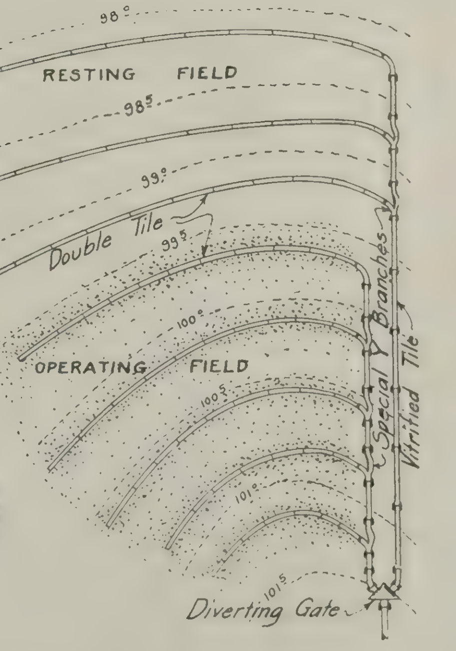
Gallons Capacity Septic Tank	No. of Persons Served	Av. No. of Hours Storage of Sewage in Septic Tank	Cu. Yds. of Excavation Septic Tank and Siphon Chamber	Cu. Yds. of Concrete Septic Tank and Siphon Chamber	Rolls of Tar Paper	Length of Tile Required for Various Soils (Feet): Rapid Seepage (Coarse Sand)	Medium Seepage (Sandy Loam)	Slow Seepage (Loam)
550	1 to 4	30	8	2½	2	250	325	380
850	5 to 8	26	11	3	2	400	450	550
1250	9 to 13	24	13½	3½	3	450 to 550	500 to 625	600 to 750
1700	14 to 20	22	17	4½	3	600 to 800	675 to 900	800 to 1100
2400	21 to 32	18	25	5½	5	850 to 1300	950 to 1450	1150 to 1750
3300	33 to 49	16	31	7½	7	1350 to 2000	1500 to 2200	1800 to 2700
5000	50 to 85	14	45	10½	10	2000 to 3500	2250 to 3700	2800 to 4200



Special Y Branch


Diverting Gate


Double Tile



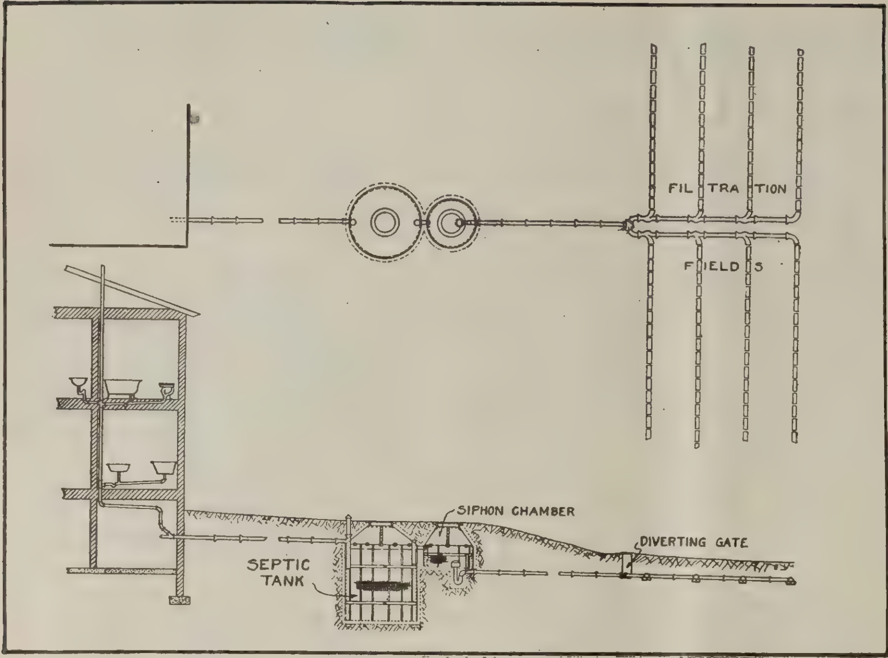
Septic Tank and Siphon Chamber

The heavier solids are settled and digested in the septic tank, but the sewage effluent still contains solids and bacteria, produces odors and needs further treatment.

The septic tank effluent passes into the siphon chamber.

Layout of Filtration Fields conforming to topography

The septic tank effluent is finally disposed of by filtering through the natural soil. Successful filtration purifies the sewage by removing the remaining solids and bacteria and supplying the necessary oxygen to prevent nuisance from odor.



Type "A" System

This system follows general features of design advocated by leading State Boards of Health. It is adapted to ordinary conditions of soil and topography.

method of disposal of domestic sewage. In similar systems adopted to individual buildings and groups of buildings the best results have been effected by settling and digesting the heavier solids in settling tanks. The sewage is filtered from these tanks in such a manner as to remove the rest of the solids, including bacteria, and to provide the necessary oxygen to prevent decomposition and foul odors.

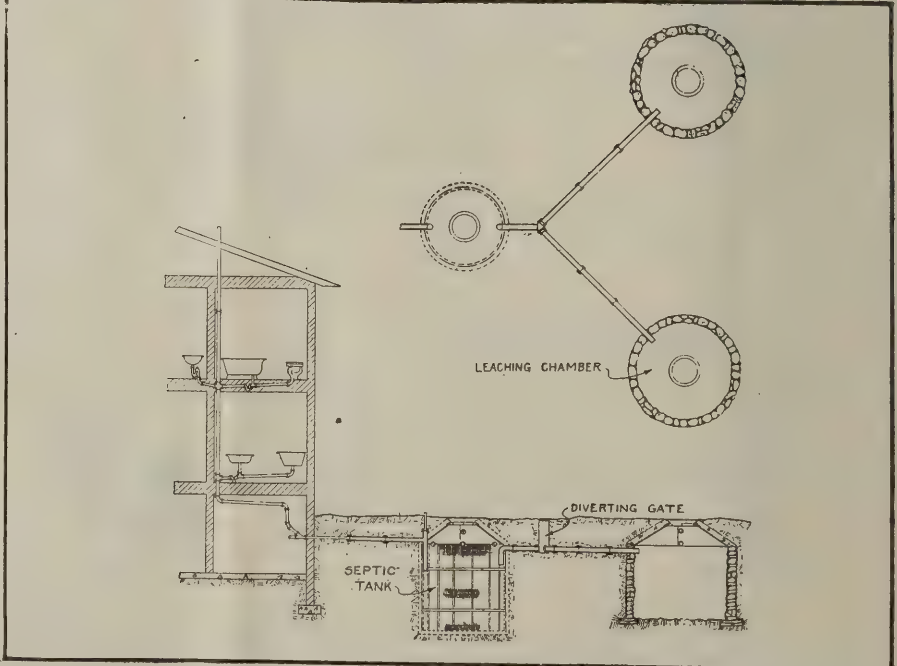
In the system illustrated here no chemicals are used. It consists essentially of a septic tank and filtration fields. The natural soil has to serve the latter purpose. A siphon tank, siphon, septic tank fittings, diverting gate, double subsoil, percolation tile, and special "Y" branches are features permitting automatic and efficient operation.

The chief function of the septic tank is to settle and digest the solids. This action is carried on by bacteria which thrive in the absence of air. During the process, oxygen is absorbed from all possible sources in the sewage. When the oxygen supply in the air is used up, such compounds as nitrates and sulphates are attacked by the bacteria and obnoxious gases are produced. The material flowing from the septic tank, therefore, needs oxygen. It still contains minute solids and is rich in bacteria. It needs further treatment.

The system shown here provides a thorough air vent for the inlet pipe, so that odors coming from the sewage will not return to the house, and the inlet sewer cannot become air-locked. Gases produced in the septic tank itself, however, cannot escape through this vent. This is shown very clearly in the picture.

The septic tank is provided with an overflow which discharges into a siphon chamber. The object of this siphon chamber is to give periodic instead of continuous flushing and to supply the additional oxygen needed by the discharge. The advantage of the periodic flushing is that it gives the soil through which the liquid is being filtered after it is discharged from the siphon chamber, an opportunity to rest. It would not get this opportunity with a continuous discharge. The action in the siphon chamber is this. The water overflowing from the septic tank rises to a sufficient height to raise the siphon cap and allow water to enter the siphon inlet. Once the siphon action is started the chamber is entirely drained into the discharge line and the siphon cap falls to its position over the inlet. As the liquid rises again a certain amount of air is caught under the siphon cap. In this way the necessary oxygen is supplied to each discharge. At all times air from which oxygen is derived, is allowed to reach the sewage through the foundation block of the tile. The discharge line leads to the filtration fields which consist of special tile lines spaced about one-eighth of an inch at each joint. These lines are so arranged that one-half of the system is used while the other half is empty, thereby giving the soil an opportunity to rest. These periods of

(Continued on page 40)



Type "C" System

Modified from type "A" to make it specially adapted to cases where land is not available for tile lines. A feature of this system is that can be obtained at small expense by changing present cesspool systems.

New Motion Picture Theatre That Seats 1500 People

Moderate in Size, But with All Convenience of a Large Theatre, Even to a Roof Garden

TIVOLI THEATRE is a new land mark among New York's motion picture theatres. Tivoli is the modern name of an old Latin town in central Italy not many miles from Rome. It is most renowned for the sublime beauty of its picturesque water fall. Equally famed also is the superb *travertine* marble found only in Tivoli, and of extraordinary strength and beauty. In memory of that lovely spot this theatre has been named.

The construction of the theatre has just been completed after being under way a little over a year, and costing approximately $300,000. No expense has been spared to make it as complete and artistic a theatre as possible, with every advantage and convenience that is to be had in the large houses of the country.

The design and erection was under the supervision of Messrs. Simeon B. Eisendrath and B. Horowitz, Architects. Construction was carried on simultaneously with alterations to the adjacent apartment buildings and stores on Eighth Avenue between 50th and 51st Streets.

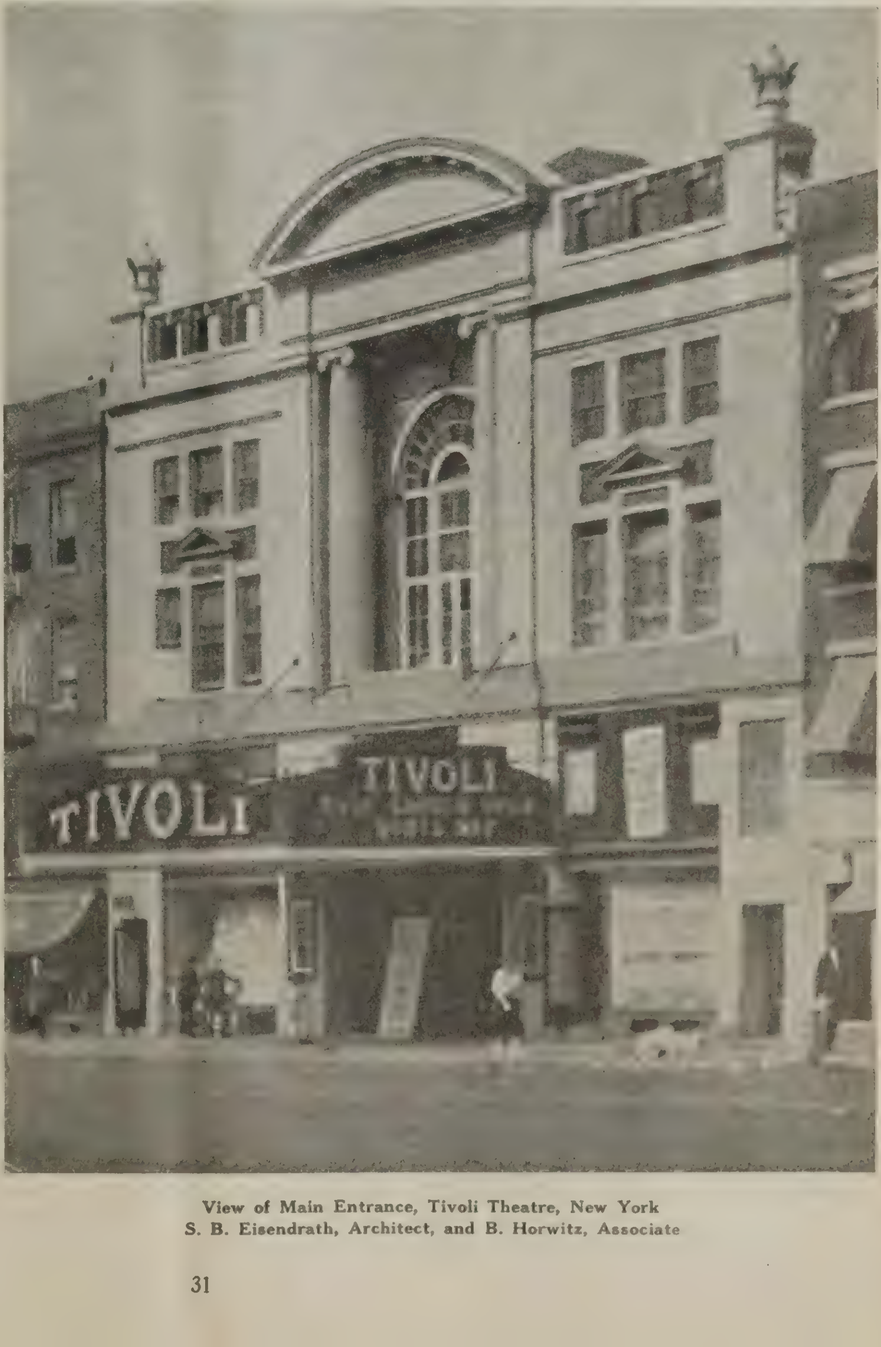
The design of the front is after the French Renaissance style with agrafitto decorations in the various panels. The beauty of the exterior is enhanced by an imposing open balcony. flanked on either side with Ionic columns, while the entire front is built of terra cotta in rich lime stone effect.

As we pass into the theatre our attention is attracted by the interior treatment of the lobby after the Italian Renaissance. The lobby itself is lined with the famous *travertine* marble brought from the quarries near Tivoli, Italy. Its two-story vaulted ceiling, adorned with many pictures of famous "movie-stars," is imposing. An elevator at the right leads to the roof garden a-top the theatre. The stairs leading to the balcony are made of fine marble and every detail has been carefully studied and finished throughout.

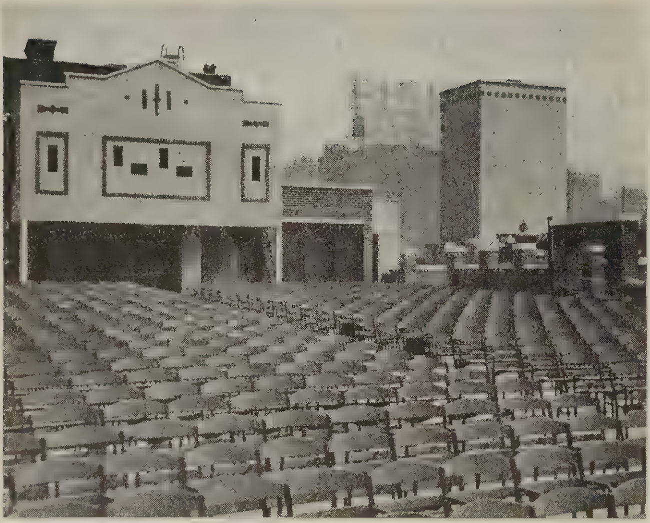
The orchestra seats approximately 1,200 people, every seat being so placed as to permit a full and clear view of the Gardiner velvet gold-fibre screen.

A large Kimball organ was especially built to suit the acoustics and architectural design of the theatre. It is an orchestral organ; that is, it is able to play the sounds of violins, violas, 'cellos, flutes, clarinets, oboes, trombones, xylophone, bells, as well as many other brass instruments. It has a special vox-humana attachment which enables it to play an imitation of a large chorus of human voices.

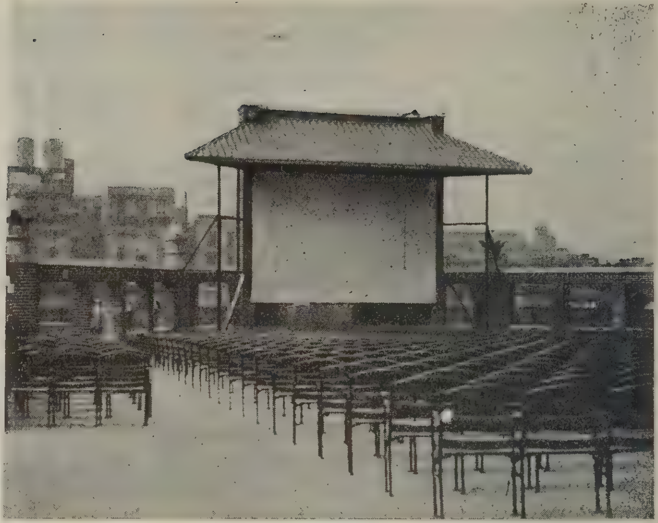
The mezzanine is reached by means of a wide marble staircase inside the orchestra and is an interesting study in marble. Flower boxes adorn the nooks and corners of this floor. Softly glowing lights shade a dim radiance



View of Main Entrance, Tivoli Theatre, New York
S. B. Eisendrath, Architect, and B. Horwitz, Associate



View of Roof Garden
Looking Back at Projection Room



Another View on Roof Garden
Looking at Screen

over everything. On this floor there is a rest room for ladies and a smoking room for gentlemen.

The balcony accommodates 600 persons. Here also the seats are so placed as to afford an uninterrupted view of the stage and screen from all angles. The number of seats in the balcony was purposely limited so as to be sure that no seats were placed too far from the screen.

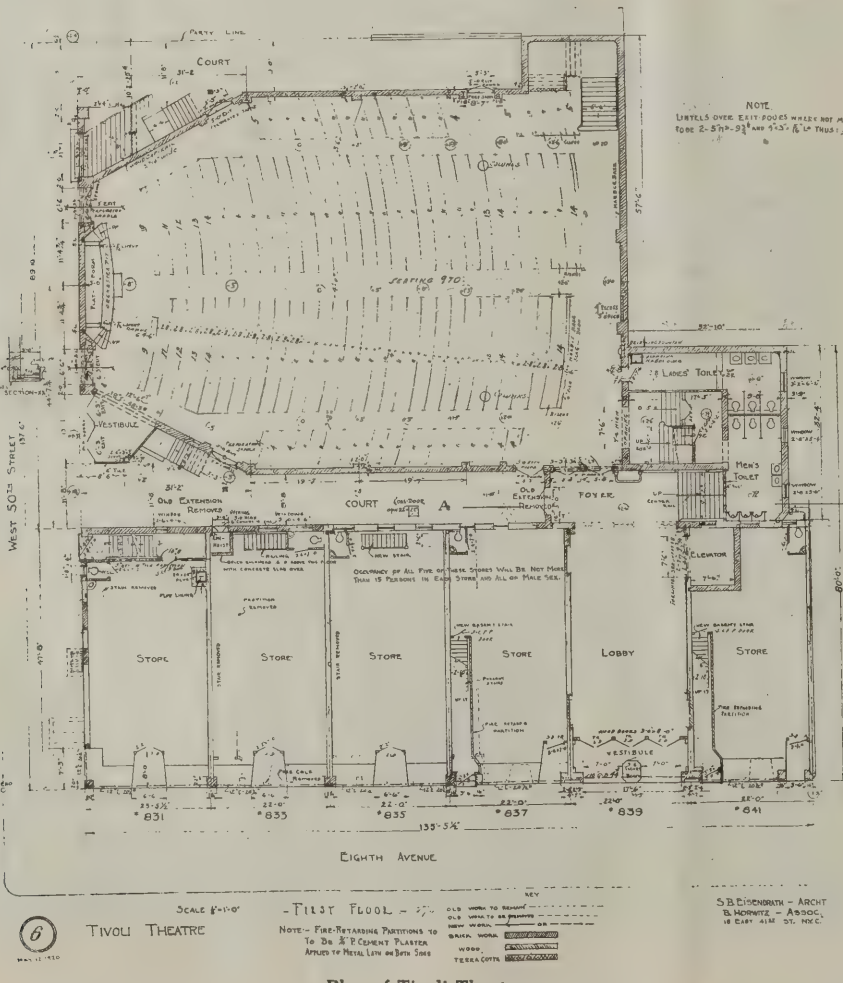
The projection room at the back of the balcony is of the latest fireproof design and construction. The projector itself is electrically driven and its unusual candle power enables it to throw the pictures with unusual intensity and clearness upon the screen.

The mechanical features of the building are less noticeable than the architectural, but they are equally important. The combined typhoon system of cooling, heating and ventilating, was selected by the architects as the most satisfactory and healthful. It requires two large fans—one near the roof to deliver specially heated air through a grill in the ceiling, and the other at the side to deliver the heated air to the lower section of the house. Before air has had an opportunity to become vitiated, it is taken out of the house by means of seven smaller fans located at different points in the theatre.

The cooling of the theatre is done in a similar manner, except that the air is not heated before being brought into the house. This system is applicable and adaptable to all weather conditions and temperature changes. The mezzanine has a specially constructed fan of its own to keep its air clean and pure.

The roof garden is reached from the lobby by the elevator mentioned above, or by means of stairs both outside and inside the theatre. This roof will be enclosed in winter and rainy weather.

In the photograph at the head of this page can be seen the elevator shaft rising above the roof level. This elevator is for the convenience of patrons of the theatre who attend the show on the roof.



Plan of Tivoli Theatre

How To Frame a Gambrel Roof

By **RICHARD M. VAN GAASBEEK**

School of Science and Technology, Pratt Institute, Brooklyn N. Y.

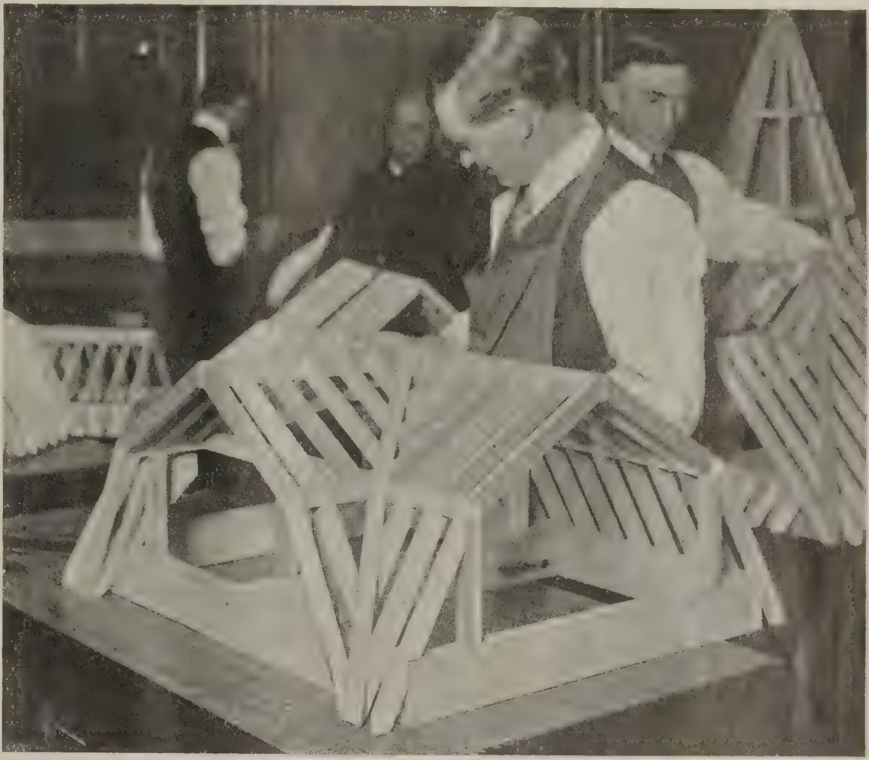
A GAMBREL roof is one whose slope or pitch is broken. Instead of the gable end having one continuous slope or pitch, it is composed of two slopes, the lower half of the roof having the greater pitch (see Fig. 2). Because of its irregular shape, the framing of a gambrel roof has a tendency to puzzle many mechanics. In reality, it is no different from the method used for a roof of equal pitch. The walls of the building form the lower plate upon which the steeper rafters rest, a second plate being stationed at the proper height to receive the upper rafters. If a second plate is not desired (as illustrated in this problem) the two rafters can be butted together, if well braced and cleated. The upper rafters are framed to the desired pitch, the same as for any roof of equal pitch. The lower rafters are framed to a different pitch, independently of the upper rafters, just as for any roof of equal pitch.

The following description is given of the problem used in Pratt Institute, Brooklyn, N. Y., for the purpose of demonstrating the principle involved in laying out a gambrel roof. The job is laid out to 1″ scale as the trade and built to the same scale for practice. In picking up the measurements from the layout, read inches as so many feet. The specifications giving the sizes of stock used in framing this particular model are listed for the purpose of having the reader try out the problem. It is only by actually framing a roof that a clear understanding of the principles involved can be solved and mastered. The sizes of stock used are larger than scale so as to afford better fastening and easier handling. This does not alter the practical value of the problem. Measurements are taken on the top edge of the rafters and on a center line and afford an opportunity for individual study that would not be possible if actual scale size timbers were used.

The proper proportion to use in framing a gambrel roof is a matter depending upon individual judgment and the needs and desires of the owner. Some builders give the upper rafters a very flat pitch while others a very deep pitch. In this problem the knuckle joint is placed half way between the facia line and the ridge, thus making both sets of rafters the same length.

Specifications--

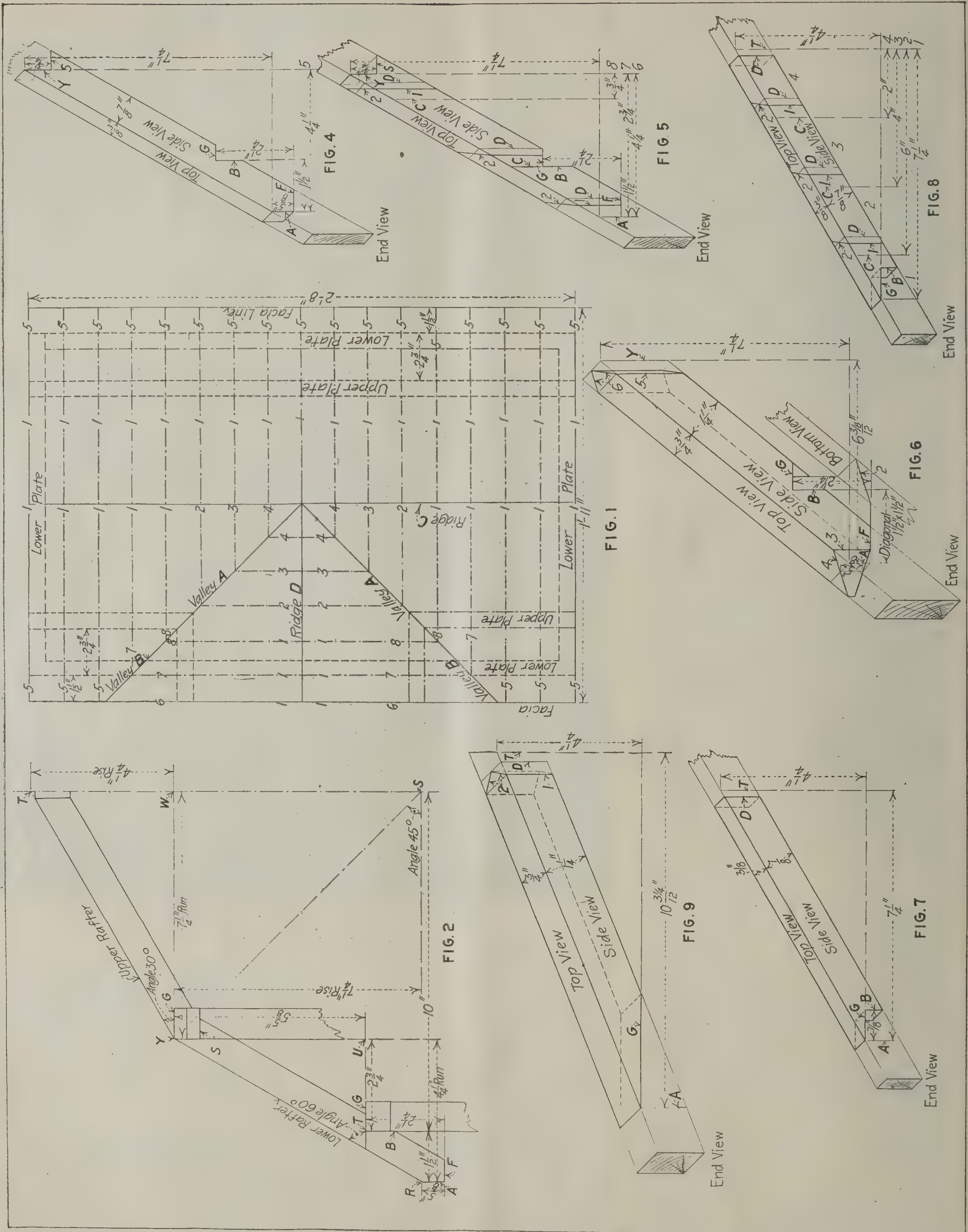
Lower plate, 7/8″ x 2½″.
Upper plate, ¾″ x 7/8″.
Valley Rafters, ¾″ x 1¼″.
Common & Jack Rafters, 3/8″x7/8″.
Ridge, 3/8″ x 1 1/8″.
Projection, 1½″.
Facia, 5/8″.
Plancher level to plate level, lower rafters, 2¼″.
Pitch, see development, Fig. 2.
Dimensions, see plan, Fig. 1.
Rafters spaced 2″ on centers.



A Miniature Gambrel Roof Framed by a Group of Future Master Builders at Pratt Institute

Lay out the plan (Fig. 1) full size on a sheet of detail paper or a board. In applying the lengths full size, substitute the word feet for inches in listing the runs and lengths of the timbers. Number each rafter and ridge as shown on the plan. Put the corresponding numbers on the rafters as they are laid out for ready identification, so as to insure the proper location of each rafter during the erection of the roof. It will also be necessary to develop an end view as shown in Fig. 2 so as to get the pitch or slope of the rafter.

A graphic method for laying the slope of the rafters is shown in Fig. 3. The lower rafters form an angle of 60 deg. with the plate and the upper rafters, 30 deg. with the plate. Both rafters are of the same length. Lay in a center line and a base line of indefinite length at right angles to each other. Bisect the angle as shown by the dotted line. With *S* as a center and any radius, scribe an arc cutting the base line at 1. With *S* as a center and the same radius, scribe another arc cutting the center line at 2. With 1 and 2 as centers and the same radius, scribe arcs at 3. From *S* draw a line of indefinite length through the intersection 3, as shown by the dotted line. Lay out the pitch of the lower rafters first. Each angle of an equal-sided or equilateral triangle



1—Plan of gambrel roof from which a working layout is made.
2—End view, showing method of developing profile of the common rafters. With the pitch, projection and plancher level given, the heights of the plates can be determined.
4—Developed length of lower common rafters No. 5.
5—Developed length of lower jack rafters Nos. 6, 7 and 8.
6—Developed length of lower valley rafter B.
7—Developed length of upper common rafter No. 1.
8—Deveolped length of upper jack rafters Nos. 2, 3 and 4.
9—Developed length of upper valley rafter A.

measures 60 deg. Lay off a distance on the base line from *S* equal to one-half the span of the building plus the projection, or 11½ inches (see plan, Fig. 1). This locates the point *R*. With *R* as the center and any radius, scribe an arc cutting the base line at 4. With 4 as the center and the same radius from *R*, scribe another arc. With *R* as the center and the same radius, scribe an arc cutting the circle at 5. From the point *R* draw a line through the arc 5 intersecting the dotted line at *Y*. This gives the slope of the lower rafters at an angle of 60 deg.

To lay out the slope of the upper rafters, first draw a base line from the point *Y* at right angles to the center line. From the base line at *S* lay off on the center line the total heighth of the roof, or 11½ inches. The slope of the gable end is the same as for a ½ pitch roof, the total rise and run being the same. From the point *Y* erect a plumb line, forming an angle of 90 deg. with the base line. With *Y* as the center and the same radius as that used in laying out the 60 deg. angle, scribe part of a circle. With *W* at the center and the same radius, scribe an arc cutting the circle at 6. From the point *Y*, draw a line thru the arc 6 intersecting the center line at *T*. This gives the slope of the upper rafters at an angle of 30 deg. Note that the sides of the 60 deg. triangle are equal. Note also that the quarter circle, or 90 deg. angle cut made by an arc scribe with a radius equal to one side of the triangle divides the arc into thirds, so that by erecting a perpendicular line at *R*, the angle of the triangle being 60 deg., the remaining angle must be 30 deg. Following the same idea in laying out the upper rafter, first lay off a 60 deg. angle, using the same radius to scribe a circle. The remaining angle must be 30 deg. as shown in Fig. 3.

These angles can also be laid out with the aid of protractors as well as with the steel square. For the lower rafters use 20½-inch rise on the blade and 12-inch on the tongue. Mark on the tongue for a 60 deg. angle. For the upper rafters use a 7-inch rise on the tongue and a 12-inch run on the blade. Mark on the blade for a 30 deg. angle.

With the top edge or outside lines of the roof determined, lay in a profile of the upper and lower rafters as shown in Fig. 2, in accordance with the dimensions given in the specifications. Locate the plate level. In laying out the birdsmouth for the lower rafters, there is no fixed rule for determining the difference from the plancher level to the plate level. The architect gives the picture of the roof, the projection and the plancher level. The mechanic must develop the lines that are not seen, namely, the plate level.

In laying out the birdsmouth care should be taken to cut a good seat and yet not weaken the rafter at this point. The edge of the upper plate forms the knuckle joint. In this particular problem the upper plate is shown to be 5⅝″ above the level of the lower plate. The lower plate is 2¼″ above the plancher level, according to the specifications.

To lay out lower common rafters the pitch of the rafter must first be determined. The run of rafter 5 on the layout (Fig. 1) is 4¼″, also shown in the development (Fig. 2). The total height from the top of the facia line *R* to the top of the upper plate *Y* is 7¼″. Find the rise in inches per foot and lay the rafters out with the fence and square.

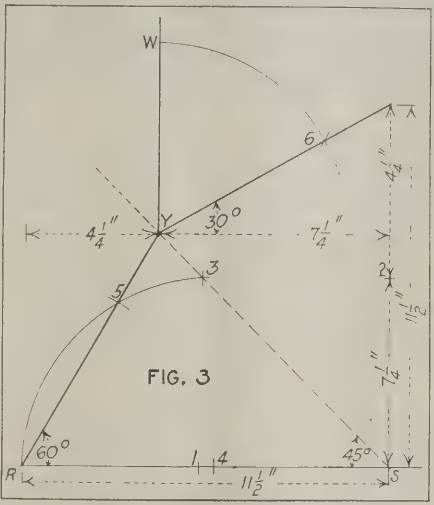


FIG. 3

Graphic Method of Laying Out 30° and 60° Pitch

$$\frac{\text{Rise}}{\text{Run}} \times \frac{12}{1} = \text{Rise in inches per foot.}$$

$$\frac{7\frac{1}{4}''}{4\frac{1}{4}''} \times \frac{12}{1} = 20\frac{1}{2}''$$

Set the fence and square at 20½″ rise on the blade and 12″ run on the tongue. Mark on the blade for all plumb cuts and on the tongue for all level cuts. Press the fence firmly against the top edge of the rafter and produce the facia line or first plumb line to the extreme left (*A*, Fig. 4). Slide the square to the right, measuring on a level line the run of the rafter, 4¼″, and produce the plumb cut against the upper plate. No deduction is to be made from this length, but the end of the rafter is notched to receive the plate, forming a strong and rigid brace.

Measure down on the plumb line *Y* from the top edge of the rafter, a distance equal to the thickness of the upper plate (¾″) and produce a level line on which the bottom of the plate will rest. Measure in from the facia line *A*, on a level line, the width of the projection (1½″) and produce the wall line *B*. Measure down on the facia line from the top edge of the rafter, the width of the facia (⅝″) and produce the plancher level *F*. Measure 2¼″ up from the plancher level, on a plumb line, locating the plate level *G*. This is shown in the development (Fig. 2) and specified in the specifications. Cut on the line *A* for the facia, on the line *F* for the plancher level, on the line *G* and *B* for the birdsmouth, and on the plumb line *Y* and level line *S* for the notch against the upper plate.

Jack rafters 6, 7 and 8 are laid out in the same way as the common rafter 5, as they are each a part of the length of rafter 5. Take the runs from the layout (Fig. 1), measuring from the center of the valley to the plumb of the upper plate. The three rafters are developed on the side of single rafter. In practice these would be laid out on separate pieces of stock. Press the fence firmly against the top edge of the rafter and produce the first plumb line to the extreme left (*A*, Fig. 3). Slide the square to the right. Measure on a level line the runs of the rafters, 4¼″ for rafter 6, 2¾″ for rafter 7 and ¾″ for rafter 8. No deductions are to be made at the upper end of the rafters, but they should be notched out to receive the upper plate as for the common rafters. Measure down on the plumb line *Y* from the top edge of the rafter, the thickness of the upper plate (¾″) and produce a level line *S*. The bottom of the plate will rest on this. The lower end of the rafters are beveled to make a fit against the side of the valley. From the extreme length obtained with the square (which is to the center of the valley), must be deducted one-half the thickness (or ½″, full) of the valley, measured on the line of the jack rafter. Measure this distance back on a level line from *C*, on the side of the rafter (Fig. 5) and produce another plumb line at *D*. Square this line across the top edge and locate the center. To lay out the top cut, so that the jacks will fit against the side of the valley at the proper angle, measure forward on a level line from the plumb line *D*, a distance equal to one-half the thickness of the jack rafter (3/16"). Produce the plumb line 1. Connect the plumb line 1 through the center line *D* as shown on the top view (Fig. 5). The top cut can also be laid out with the steel square by using the length, 23¾" (bridge measure of the run, 12" and the rise 20½") on the blade and the run, 12", on the tongue. Mark on the length for the top cut. Rafter 8 is also cut out for the birdsmouth, which can be laid out by using a common rafter as a pattern. Or it can be done by laying out again, starting from the first plumb line *A*. Measure in on a level line from the plumb line *A*, the width of the projection (1½") and produce the wall line *B*. Measure down on the facia line *A* from the top edge of the rafter, the width of the facia (⅝") and produce the plancher level *F*. Measure (2¼") up from the plancher level, on a plumb line, locating the plate level *G*. For rafters 6 and 8, cut on the plumb line *Y* and the level line *S* for the notch against the upper plate, and on the plumb line 1 on the bevel 2 for the cheek cut against the valley. For rafter 7 cut on the plumb line *Y* and the level line *S* for the notch against the upper plate, on the line *G* for the plate level and on the plumb line 1 on the bevel 2 for the cheek cut against the valley.

The valley rafter of an equal pitch roof crosses the plate at an agle of 45 deg., or the diagonal of a square. The diagonal of the unit of 12" used in laying out the common rafters is 17". In other words, while the common rafter runs 12", the valley runs the diagonal of 12" and 12", or approximately 17", which is the constant unit used for laying out hips and valleys for roofs of equal pitch. The rise remains the same as that used for the common rafter (20½").

Set the fence and square at 20½" rise and 17" run (for convenience, 10¾" on the tongue and 8½" on the blade). Mark on the tongue for all plumb cuts and on the blade for all level cuts. Press the fence firmly against the top edge of the rafter and produce the first plumb line *A*, at the extreme left (Fig. 6). Slide the square to the right. Measure on a level line the run of the rafter (6", taken from the layout, Fig. 1), measuring from the facia line to the upper wall line. Mark on the tongue as at *Y* (Fig. 6). No deduction is to be made from this length, but the corners must be beveled to fit the intersection of the upper plate and return for the gable end. Square the line *Y*, across the top edge of the rafter and locate the center. From the plumb line *Y*, measure forward on a level line one-half the thickness of the rafter (⅜") and produce the plumb line 5. Square this line across the top edge of the rafter and connect the two outside points with the center, as shown on the top view (6, Fig. 6). The top cut can also be laid out with the steel square by using the length, 13¼" (bridge measure of the run, 17", and the rise 20½") on the blade and the run, 8½", on the tongue. Mark on the length for the top cut. For convenience use one-half the run, 8½", and one-half the rise, 10¼", giving the bridge measure, 13¼". The valley is cut off on the front end at the facia line. Square the facia line *A* across the top edge of the rafter and locate the center. Measure back on a level from the line *A*, one-half the thickness of the valley (⅜") and produce another plumb line on the side of the rafter, as at 3. Connect this plumb line through the center as shown on the top view. To locate the wall line and plate level, measure in on a level line from the facia line *A*, the diagonal of the projection (measuring on the line of the valley from the facia line to the wall line) or the diagonal of 1½" and 1½", or $2\frac{1\frac{1}{2}''}{12}$ and produce the plumb line *B* on the side of the rafter. Measure down on the facia line *A* from the top edge of the rafter, the width of the facia (⅝") and produce the plancher level *F*. Measure 2¼" up from the plancher level on a plumb line, locating the plate level *G*. To make a fit against the side of the wall at the proper angle, square the wall line *B*, across the bottom edge of the rafter, and locate the center. Then measure back on a level line on the side of the rafter from the line *B*, one-half the thickness of the valley (⅜") and produce the plumb line 1. Square across the bottom edge of the rafter and connect through the center on the bottom edge (as shown at 2, Fig. 6, bottom view). Cut on plumb line 3 on bevel 4 for the facia line; on line *F* for the plancher level; on line *G* make a square cut; and on plumb line 1 and bevel 2, for the birdsmouth; and on plumb line 5 on either side of the valley and bevel 6 on the top edge for the cut against the walls. Cut two valleys the same length in pairs.

RUNS AND LENGTHS OF RAFTERS USED IN FRAMING GAMBREL ROOF

Number of Rafters	Quantity of Rafters	Runs	Lengths	Remarks
1	33	7' 3"	8' 4¼"	Upper common rafters
2	2 pair	6' 0"	6' 11⅜"	Upper jack rafters
3	2 pair	4' 0"	4' 7⅝"	Upper jack rafters
4	2 pair	2' 0"	2' 2¾"	Upper jack rafters
A	1 pair	10' 3¼"	11' 1"	Upper valley rafters
5	23	4' 3"	8' 5"	Lower common rafters
6	1 pair	4' 3"	8' 5"	Lower jack rafters
7	2 pair	2' 9"	5' 5⅜"	Lower jack rafters
8	2 pair	0' 9"	1' 5⅞"	Lower jack rafters
B	1 pair	6' 0⅜"	9' 4½"	Lower valley rafters
C	1 pair	2' 8"	2' 8"	Ridge
D	1 pair	0' 11½"	0' 11½"	Ridge

To lay out upper common rafters the pitch of the rafter must first be determined. Take the run of the rafter from the layout (Fig. 1), measuring from the upper wall line to the center of the ridge (7¼"). The profile of the rafter is shown in the development (Fig. 2). The total height from the level of the upper plate to the top of the ridge end of the rafters is 4¼". Find the rise in inches per foot and lay the rafters out with the fence and square.

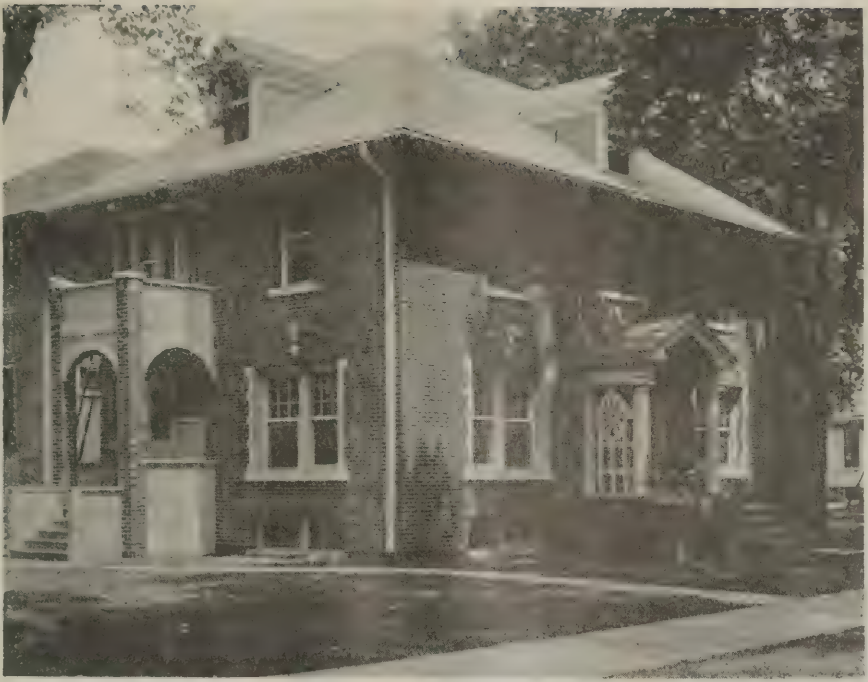
$$\frac{\text{Rise}}{\text{Run}} \times \frac{12}{1} = \text{Rise in inches per foot.}$$

$$\frac{4\frac{1}{4}''}{7\frac{1}{4}''} \times \frac{12}{1} = 7''$$

Set the fence and square at 7" rise on the tongue and 12" run on the blade. Mark on the tongue for all plumb cuts and on the blade for all level cuts. Press the fence firmly against the top of the rafter and produce the first plumb line *A* (Fig. 7), to the extreme left. Slide the square to the right, measuring on a level line

(*Continued on page 54*)

A STUDY IN BRICK

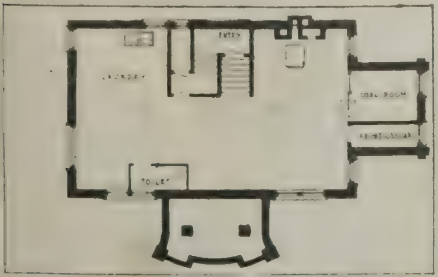


Andrew E. Norman, the architect for this attractive brick house, has accomplished a really artistic effect in his handling of the materials. The result is truly a study in brick

THE home of Otto L. Pahlgren, Chicago, Ill., is an example of an interesting treatment of a brick house. The picture shows a view of the front and rear entrances from the southwest, the rear entrance happening to be at the side. One of the outstanding features of the exterior is the attractive front entrance, which opens out on to a terrace paved with brick.

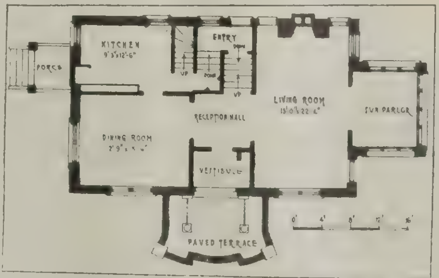
The elliptical arches over the double windows are not supporting arches, but are for artistic effect, the weight of the brick work being carried on a lintel spanning supporting the window opening. The stone work of the jambs and sills, not to forget the keystone of the arch, produce a pleasing contrast with the red brick.

The side entrance is quite unusual and indicates that it has not been neglected just because it is a side entrance. The solid brick piers extending from the ground to the second story support the small balcony off from the sleeping porch. Note the small door for icing the refrigerator at the right of the kitchen entrance.



Basement Plan

The plan of this house is nearly square and provides for kitchen, dining room, sun parlor, reception hall and large living room on the first floor, with a laundry in the basement. The second floor provides three large bedrooms and sleeping porch. The master's bedroom and sleeping porch are provided with built-in closets, while the other two bedrooms are equipped with wardrobes. All the rooms of the house are corner rooms and the consequent lighting and ventilation is good.

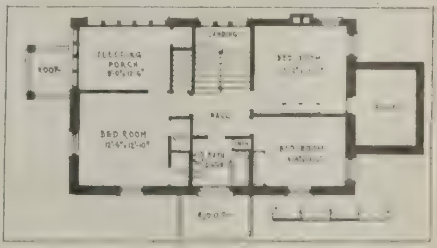


First Floor Plan

Although this plan is rectangular and indicates economy of construction, the layout of the rooms does not indicate a similar economy of planning. On the first floor considerable space is taken up with a large vestibule and reception hall. These features are very desirable at times, particularly when one wants to spend the money that they cost. On the second floor some plumbing expense could be saved by placing the bathtub over the kitchen instead of at the front of the house.

These are matters, however, which depend largely on the individual taste and pocketbook of the owner. It is quite evident, however, that this house was not built as a speculative proposition, but to suit the particular taste of its owner.

On the other hand, the architect has shown a keen appreciation of economical construction, in putting together a more or less elaborate layout of rooms in such a way that the owner will get the most for his money.



Second Floor Plan

Small Capital Required To Build Moderate-Cost Homes

How a $7,500 House Can Be Financed by Builder on $1,500 Capital and Sold To Buyer With $1,500 Cash and Earning Capacity of $40 to $50 a Week

THE prospective home builder on a moderate salary and with small savings finds himself more or less up against it today if he wants to build a home. In the September issue of BUILDING AGE an article entitled "Beating Building Costs in Birmingham, Ala.," told of a method that is used to some extent in various parts of the country to tide over the home builder until such a time as his limited capital will allow him to proceed with the kind of house he wants. This method is largely of a makeshift nature to meet emergencies forced by high rents and consists of building and living in a small cheap structure at the rear of the lot, this structure to be used later as a garage when the final house is built.

Another method described in the recent issues of BUILDING AGE consists of the quantity production of small houses, thereby eliminating much of the labor, material and overhead costs of a single house. Builders have been able to construct concrete houses in this way at a very reasonable figure, varying from $4,000 up. One of the most interesting examples of this kind of work has been conducted in Rochester, N. Y., by Kate Gleason, engineer. Miss Gleason has been able to produce these houses so that they could be sold at the remarkably low figure of $4,000. Such an investment is naturally within the reach of the buyer with small capital. Some of Miss Gleason's houses are shown with this article. Naturally, when costs are cut to the bone in this manner, there can be nothing unusually startling in the planning or exterior treatment, but they are real, good, livable houses.

Miss Gleason's statement to the Editor of BUILDING AGE presents the most urgent problem confronting the builder today, namely, "How can the man with limited capital and earning capacity finance the building of his home?"

BUILDING AGE has put this question to many of its builder readers and they all agree that it is some problem, although many of them have found their way out of it.

The man earning, say, $40 to $50 a week and with $1,500 in the bank has gradually watched his landlord raise the rent during the past three or four years from $35 a month to $75 or $80 a month. The time has about arrived for him to break off relations with his present landlord and either move into cheaper quarters or to build himself a house where his $80 a month outlay will be an investment and not a loss. It is not human nature to move into cheaper and less desirable quarters, except as a last resort. The man, therefore, investigates the possibility of building.

Builders in the vicinity of New York have had this problem put up to them so often in the past few years and have gotten so little financial assistance from the large loaning companies, except through the medium of brokers who demand excessive bonus that it has largely been necessary for them to develop their own plan of financing. While their plans differ somewhat in minor detail, in general they are about as follows:

Assume that the builder is to put up a house and that the improved property will cost $6,500. Through his local bank the reputable builder is able to negotiate a building loan of 60 per cent. of that money, say, $3,900, payable in three installments at different stages of the work. The final payment is made when the house is practically completed. Obviously the builder himself needs some capital of his own to begin the job. Assume that he has $1,500 of his own cash and that his reputation and credit with material dealers is good. Using this credit and his $1,500 cash in equal amounts, he is able to proceed with approximately $3,000 worth of construction of the house. Before this stage has been reached it is easy for him to get his first payment on the building of $1,300 from the bank. He is than able to proceed further, paying up most of his bills to the materialmen and getting credit as before, until he has reached the stage where the bank makes the second payment. When the final house is completed his financial status is something like this:

Photo from Underwood & Underwood

More Money for More Houses Means Lower Rent
New York is not the only city afflicted with eviction cases

Personal Cash Investment...	$1,500
Bank Loan	3,900
Bills owing to Material Dealers	1,100
Total	$6,500

Let us say he sells the house for $7,500. Fifteen hundred of this is paid in cash. The bank loan becomes a permanent mortgage and is assumed by the buyer; and the builder takes a second mortgage from the buyer for the difference, namely, $2,100. This leaves the builder with $1,500 cash and a second mortgage of $2,100 as his assets, to be reckoned against the $1,500 cash investment of his own, $1,100 worth of bills to material dealers. To pay his bills and realize his profits he must cash in on his second mortgage which he takes to a mortgage discount company, selling it to them for 80 per cent. of its value. For his $2,100 second mortgage he therefore

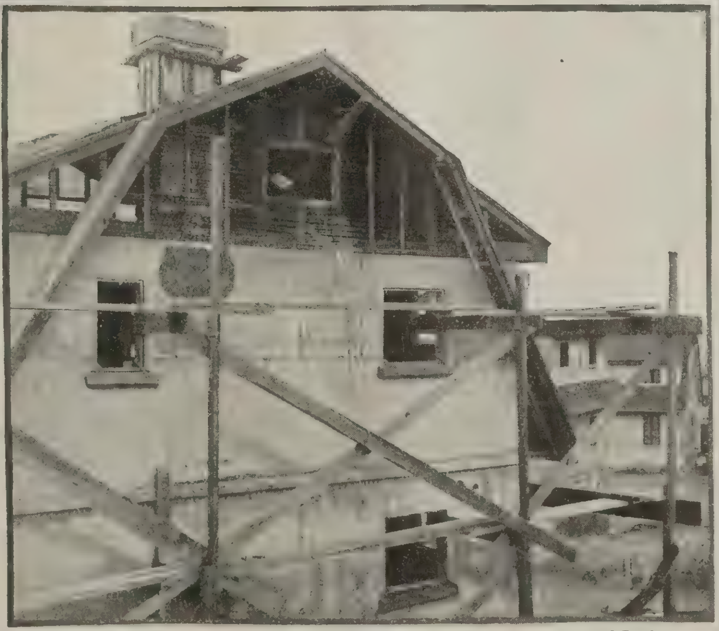
An artistic doorway

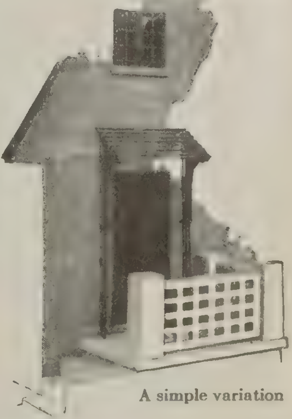
Semi-Detached

And a garage, too!

Simplicity gives character

A pretty gable window


Miss Kate Gleason creates pleasing effects—with Herringbone Metal Lath


A simple variation

Doesn't look like the back yard, does it? Miss Kate Gleason's Housing Development, at East Rochester, N. Y.

realizes $1,680 cash. This, with the $1,500 cash payment amounts to $3,180 against the $2,600 represented by his own cash investment and the bill he owes. In other words, if he sells the house for $7,500, his profit is $580, or about 9 per cent. of the cost. The buyer must then make annual payments on the property as follows:

Interest on first mortgage $3,900 at 6 per cent.	$234
Interest on second mortgage $2,100 at 6 per cent.	126
Amortization of second mortgage in 3 years	700
Total	$1,060

This amounts to about $88 a month and represents only those payments that he must make in order to retain his equity in the property. It does not include taxes, insurance and the like.

Oftentimes it is more advantageous for the home buyer to arrange his financing through the building and loan associations. It is generally possible for the borrower to make two different kinds of arrangements with these associations. One possibility is a loan of probably 80 per cent. of the value of the property. In this case such a loan would be 80 per cent. of $6,500, or $5,200. It will be necessary to make monthly payments on this amount, which payments would go to buy off the indebtedness and also the interest. These monthly payments will probably amount to about $50 a month or $600 a year. This loan of $5,200 plus the $1,500 cash which the buyer already has, enables him to make a cash payment to the builder of $6,700.

Obviously the second mortgage in this case would be practically nothing and the loss involved in discounting such a mortgage would be greatly reduced. The builder could, therefore, sell the house for less than $7,500 and still make approximately 10 per cent. profit.

For example, assuming the builder sold the house for $7,200, receiving $6,700 in cash and leaving the balance of $500 to be covered by the second mortgage from the buyer. Discounting this second mortgage at 80 per cent. the builder would receive $400 for it plus the $6,700, or $7,100, in actual cash. With this he would pay off $3,900 bank loan and $1,100 in bills outstanding, leaving him $2,100. Of this amount $1,500 represents his original cash and $600, or about 9½ per cent., represents his profit.

The buyer makes the following annual payments:

Payment to building and loan	$600
Amortization second mortgage in 3 years	167
Interest second mortgage 6 per cent.	30
Total	$797

—or about $67 a month.

Another arrangement that is possible for the buyer to make with the building loan association is in the nature of a first mortgage at 6 per cent. which need not be amortized, but which must be renewed on every due date and which is subject to recall on that date if desired by the building loan association. Such a mortgage can be paid off from time to time, so that the total indebtedness is reduced. But it leaves the borrower in a position that is not quite so certain, inasmuch as there is always a possibility of the loan being called in on the due date, and if it is not called in, it must be renewed with the attending expense of search, appraisal, etc.

Assuming that the borrower wishes to enter such an agreement, he makes the following annual payments in order to retain his equity in the property:

Interest on first mortgage to building loan $5,200 at 6 per cent.	$312
Amortization second mortgage $500 in 3 years	167
Interest second mortgage $500 at 6 per cent.	509
Total	$509

—or about $43 a month.

From these figures it is obvious the building and loan associations offer the best possibilities for the home buyer with a moderate capital. These sources of capital are not open, however, to the speculative builder. He must resort to his local bank or similar sources, as explained above. With the scheme that has been outlined, however, he has been able to put buildings and houses with a limited amount of his own capital.

The building and loan associations on the other hand, offer the best solution for the man with limited capital who wants to buy his home. They place at his disposal more available cash than he could get at the bank In the example cited above we have assumed that he gets 80 per cent. the cost of the improved property. This figure depends upon the association's valuation of the property, the integrity and economy of the builder, location and desirability of the property, etc.

With the first arrangement of financing his monthly payments amount to about $66 a month for the first year and decrease in proportion as he pays off his second mortgage.

With the second arrangement his monthly payments amount to only $43 a month, but he is always in the uncertain position of having his first mortgage called in, or having to renew it on every due date with the attendant extra expense.

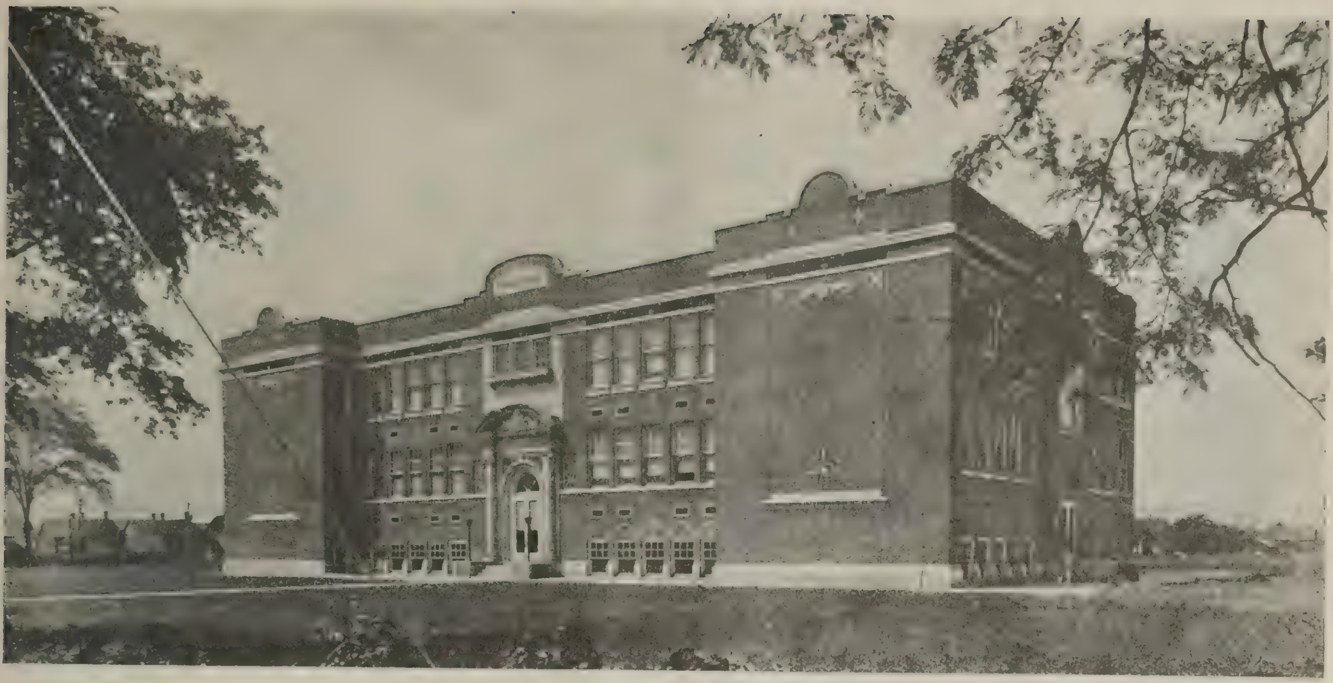
Safe Sewage Disposal

(Continued from page 30)

use and rest are controlled by the diverting gate shown in the main discharge line, which allows the flow of sewage to be changed from one trench to the other by shifting the gate.

Naturally, the pit of the discharge line must be slightly away from the siphon chamber. If a straight "Y" fitting were used in the trenches therefore, the tendency would be to have the lower trench full and probably nothing in the upper trench. Since the land slopes from the upper to the lower trenches, and the flow of the sewage is naturally in that direction anyway, such a condition as mentioned above tends to give the soil surrounding the lower trench the bulk of the work of filtration, while the outer soil has very little to do. In order not to clog the lower soil, therefore, special "Y" branches are often used. These are designed to divert a small amount of sewage into each trench, and if any trench is left empty, the lower one will be. Perhaps, the manner of operation of filtration fields has determined the success or failure of every system.

In the system shown, sewage stops under the sides of the "U" tile for the entire length of the trench, producing even distribution. This is an important factor in securing best filtration results. The automatic, periodic discharge of the siphon is another desirable feature and the possibility of allowing one-half the field to rest while the other half works, prevents contamination of water and possibility of disease. The diverting gate which accomplishes this is changed twice a month, and the septic tank where the solids are deposited is cleaned out every four or five hours.



Eliza B. Warren School at Terra Haute, Indiana
Johnson, Miller & Miller, Architects.

A Roomy High School of Artistic Design

THE Eliza B. Warren School at Terre Haute, Ind., is particularly attractive and is a good example of a well designed school for an average town. The outstanding feature of the exterior is the beautiful stone entrance with its Ionic columns on either side of the doorway. The building is set high enough to afford a lighted basement. For this reason it is necessary to reach the first or main floor by a flight of steps.

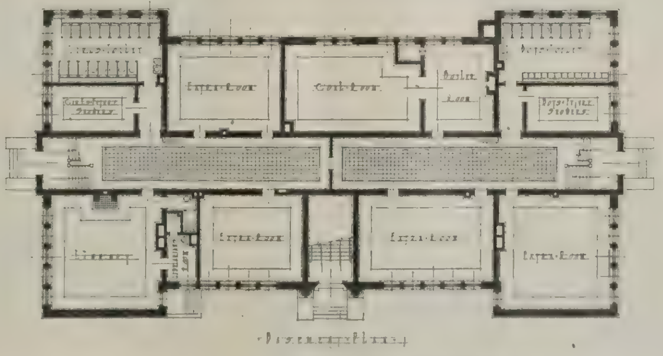
On this floor is the principal's office, eight class rooms and a small supply room.

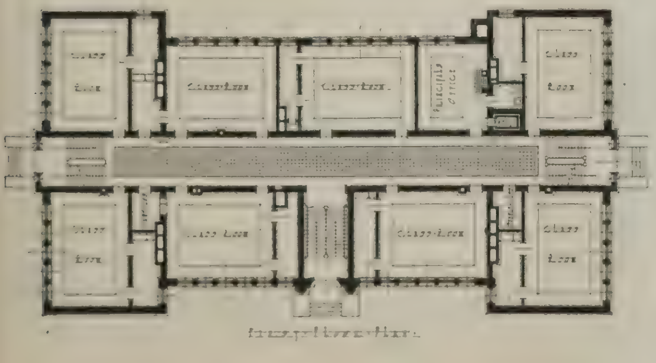
At each end of the building is a side entrance, leading to the main floor or to the basement. Each class room is provided with its separate wardrobe.

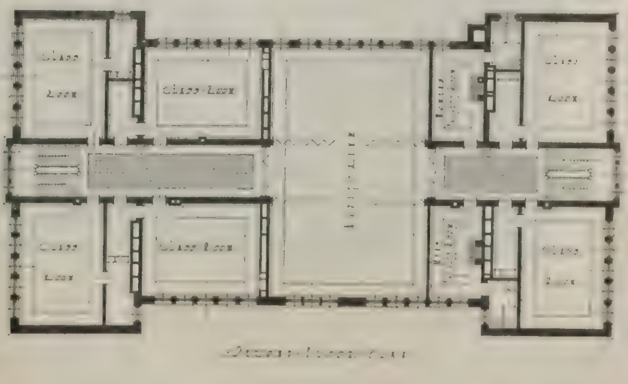
The second floor plan provides for a large auditorium in the center of the building. On the left of the auditorium are four class rooms; while on the right there are two class rooms and a separate faculty room for the men and women.

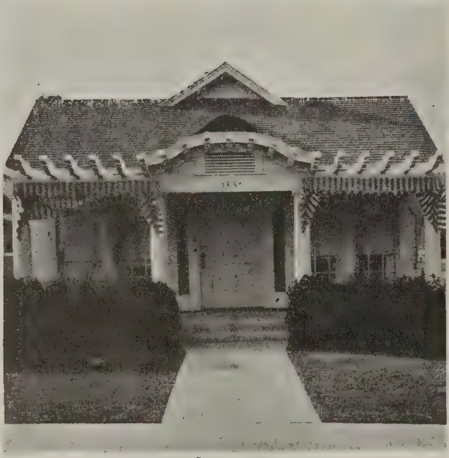
The basement provides for, besides the coal room, boiler room and toilets, four extra rooms, a library and showers for the girls and boys.

The fourteen regular class rooms should provide accommodations for 500 scholars; while the four extra rooms on the basement floor could probably provide emergency accommodations for 150 more. The ultimate capacity of the school is, therefore, 650 pupils, with provisions made for future extension of the building.

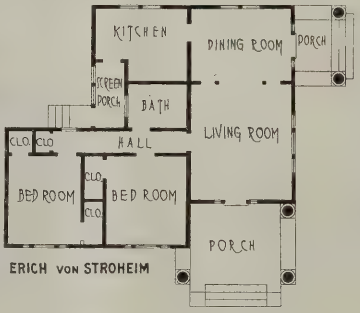




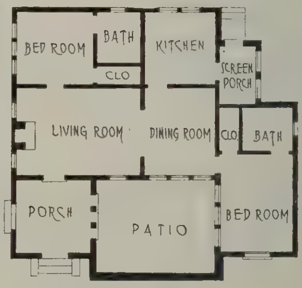




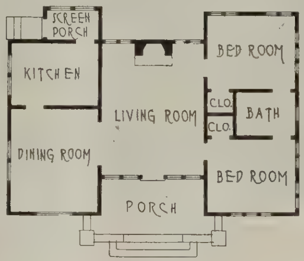
Home of Herbert Rawlinson at Hollywood, California.



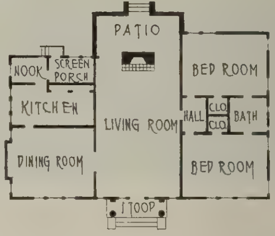
ERICH von STROHEIM



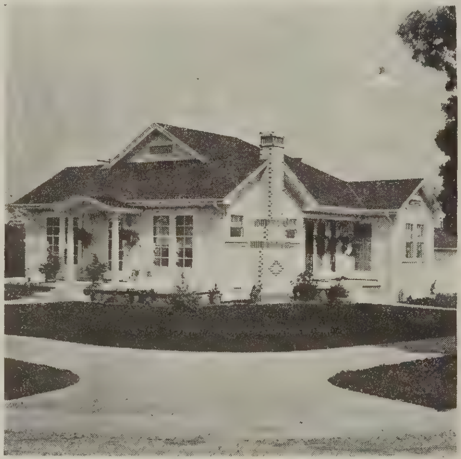
PRISCILLA DEAN



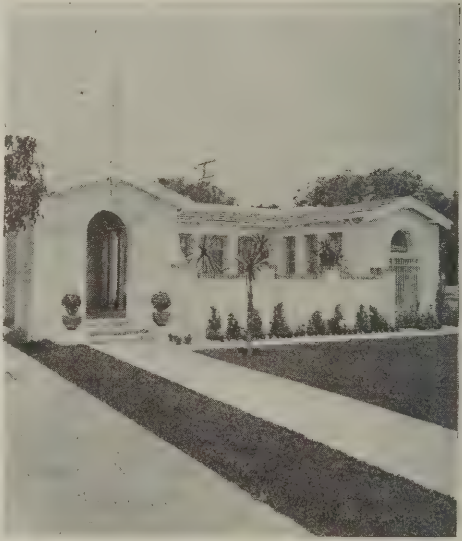
MARIE PREVOST

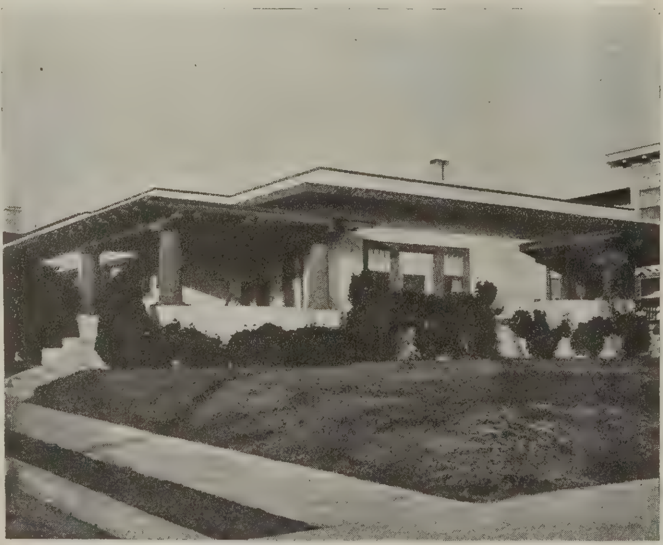


★ HOMES OF OUR



Eileen Sedgwick's attractive bungalow at Hollywood.





Priscilla Dean has chosen a real romantic Spanish type for her home.

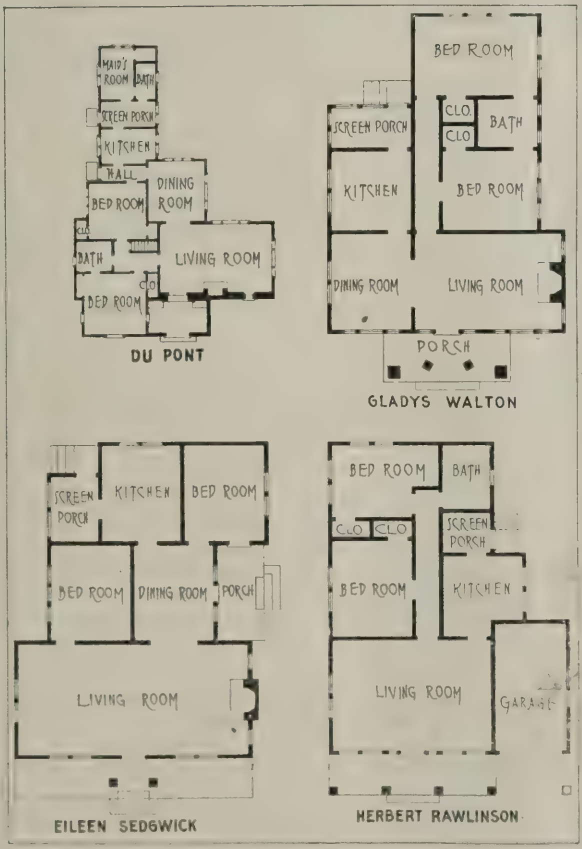
Note the German atmosphere in the architecture of Erich von Stroheim's bungalow.

(Courtesy Universal Film)

Marie Provost's Hollywood home is inviting and in good taste.

Miss Dupont's pretentious home.

MOVIE STARS ★



A richly impressive exterior has Gladys Walton's little home.
Lee Moran's bungalow. Simple and attractive and beautiful withal.

(Courtesy Universal Film)

Legal Department

Answers to Inquiries

When Fences Mark Property Boundary Lines

I OWN a house and lot that came to me from my mother at her death. My parents bought it in 1878. Several years before that a strip 36½ feet wide had been sold off of the original lot. But when a fence was constructed it was so built as to enclose but 35 feet, and the fence remained in its original position for more than 40 years, leaving 1½ feet of the above mentioned strip on my side of the fence. In 1911, the strip was sold to one of my present neighbors as embracing 36½ feet. He then removed the fence and constructed a blacksmith shop flush with the 36½ foot line and within eight feet of my house. Did he have any right to remove the fence, and could I compel him to remove the blacksmith shop? *G. C., W——, Ohio.*

Answer.—Under the laws of Ohio the fence line became the legal boundary line if for 21 years, or more, continuously it was treated by the adjoining owners as the property line, although a survey may show that the fence was 1½ feet off the true line. Therefore, your letter strongly tends to show that whoever owned your property could have restrained your neighbor from encroaching beyond the old fence line, on the ground that title to the 1½ foot strip had been lost by adverse possession. But if the fence was maintained on a continued understanding that its maintenance should not be regarded as a waiver of right to insist on ownership to the true boundary line, the neighbor would not be barred of right to insist on all that was called for by his deed.

Whatever may have been the merits of your claim at the time the fence was removed, your letter indicates that your rights have been lost through your delay in asserting the claim. We believe that almost any judge would be apt to hold that your act, or that of your predecessor in ownership, in permitting the neighbor to remove the fence and construct a building on the true line would be regarded as manifesting an understanding on your, or your predecessor's part, that no adverse claim was ever made of ownership of the strip involved. Hence, we believe that the chances would be very slight of your being able now to establish title to the 1½ feet on the ground of adverse possession, when it is considered that the strip really belongs to the adjoining land and the owner has been in undisturbed possession for several years.

All readers are invited to ask any questions that will help them solve any legal difficulty that they may be in. Our legal adviser will answer direct by mail and give his opinion as to the correct procedure. Questions and answers of general interest to the trade will be published in these columns. All inquiries must be accompanied by the name and address of the correspondent so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nome de plume. Remember that this service is free to subscribers. Address Legal Department, Building Age, 920 Broadway, New York City.

However, your second question possibly presents a stronger matter in your favor. Even if your neighbor has good title to the strip mentioned, giving him ownership of land within eight feet of your house, it does not follow that he is entitled to maintain a blacksmith shop there. Here, again, however, your case is materially weakened if you or your predecessor in title has stood by for several years without complaining.

If the property is situated in a residence district, there can be no doubt that erection of the blacksmith shop could have been enjoined before its construction was completed. But if it has been maintained in its present condition for several years, without complaint, the chances are that the courts would refuse to grant you an injunction, on the ground that you or your predecessor in interest acquiesced in maintenance of the shop. On the other hand, injunction would lie to prevent continuance of any nuisance arising from some new and annoying method of conducting the business. And it seems that the delay in suing would not preclude a suit to recover damages for injury resulting from your continued deprivation of the comfortable enjoyment of your dwelling-house. But it seems that under the laws of Ohio you would be limited to a recovery of damages for four years preceding commencement of the suit, so far as the past is concerned; any claim for annoyance antedating that period being outlawed.

Illinois Statutes Affecting Contractors and Materialmen

PLEASE set us straight on the following matters affecting materialmen and contractors in Illinois: (1) The Lien Law as it applies to the contractor, and (2) to the owner of the property on which the building is under construction or constructed, and (3) as it applies to a renter of the property. (4) The statute of limitations on open accounts and notes. (5) Does the statute of limitations affect the lien rights of the material dealer?" *D. L. Co., D——, Ill.*

Answer.—The first three questions are so broad as virtually to call for a complete exposition of the Illinois lien law, which is impossible within the space here permitted. However, the main provisions may be summarized as follows:

One who by agreement with the owner or land, or with one whom the owner has authorized or knowingly permitted to improve the same, furnishes material, fixtures, apparatus, forms or form work used in construction where cement, concrete or like material is used, or machinery in building, repairing or ornamenting a house or other building, walk, driveway, fence or improvement on or connected with such land, or who fills, sods or excavates such land, or does landscape work thereon, or who raises or lowers a house thereon, or moves a house thereto, or who performs any services as architect, mechanic, etc., shall be known as a contractor, and shall have a lien on the premises for the amount due him for such material, services, etc.

The lien extends to whatever interest the person causing the improvement to be made owns in the premises, whether it be the fee title, a life estate or a leasehold interest. So the interest of a tenant may be sold under foreclosure where he contracts and fails to pay for improvements. And, in such case, the owner's interest and title may be sold, it seems, if he authorized or knowingly permitted the tenant to make the improvement.

Taking of other security does not waive right to lien in the absence of agreement to the contrary.

Lien statement must be filed within four months after materials or services have been completely furnished, as to principal contractors, and suit to foreclose the lien must be commenced within two years from completion of the work. Sub-contractors (materialmen furnishing materials to contractor appear to fall within this class under the Illinois law) must give the owner written notice of their claims within sixty days after completion of their contracts. From the date of such notice the sub-contractor has a lien against funds in the hands of the owner belonging to the contractor. Suit may, ten days after service of the notice, be brought jointly against the owner and contractor, or the sub-contractor may file his petition for a lien within four months after his final payment becomes due.

Personal liability on an open account outlaws five years after the account becomes due, under the Illinois law, except as kept alive by partial payment or written recognition of the account as a subsisting debt. A note outlaws ten years after falling due, except as kept alive for a like period dating from any payment on it or a new written promise to pay. These periods of limitation prescribed by statute relate only to personal liability of the debtor, and have no relation to the periods within which mechanics' or materialmen's liens may be preserved or enforced.

Recent Decisions

Owner's Duty To Express Dissatisfaction in Progress or Work

AN owner's complaint in a suit to recover damages for defendant contractor's failure to construct a building in accordance with contract requirements is held by the District Court of Appeal for California to state a cause of action. (Banducci v. Sresovich, 190 Pacific Reporter, 72.) The contract contained this clause:

"Ninth: The payment of the progress-payments by the owner shall not be construed as an absolute acceptance of the work done up to the time of such payments; but the entire work is to be subject to inspection and approval of the architect, superintendent or owner at the time when it shall be claimed by the contractor that the contract and works are completed; but the architect, superintendent or owner shall exercise all reasonable diligence in the discovery, and report to the contractor, as the work progresses, materials and labor which are not satisfactory to the architect, superintendent or owner, so as to avoid unnecessary trouble and cost to the contractor in making good defective parts."

Interpreting this provision of the contract, the Court of Appeal says:

"It was, as claimed by respondent, the duty of plaintiff, during the progress of construction, to 'exercise all reasonable diligence in the discovery, and report to the contractor' as to materials and labor which were not satisfactory. . . However, the question of whether plaintiff complied with this provision is unimportant, since by the terms of the contract the entire work, upon the claim of completion made by the contractor, was to be subject to the approval of the architect, superintendent, or owner, regardless of whether or not the owner or architect, during the progress of the work, had expressed dissatisfaction therewith. In other words, the mere failure of plaintiff, during the progress of the work, to express dissatisfaction therewith, or direct the attention of the contractor to omissions, could not upon the facts shown be deemed a waiver by plaintiff of his right to a structure of the dimensions, and constructed of the materials, called for by the contract, and for which he paid the price. Perry v. Quackenbush, 105 Cal. 310, 38. Pac. 740. This being true, and since, as alleged in the complaint, defendant failed to construct the building in accordance with the plans and specifications therefor, but in doing the work used materials other than those called for by the contract, and omitted the doing of work specified therein, it follows that it is sufficient to state a cause of action."

Substantial Performance Of Indefinite Contracts

"THERE must be a substantial, not a punctilious, performance of builders' contracts," declares the Utah Supreme Court in the recent case of Stephens v. Doxey, 198 Pacific Reporter, 261 "So, too, it is generally held that on the one hand the contractor may not be permitted to profit by reason of his noncompliance with the contract, while on the other hand the owner will not be permitted to reap the benefits of the added value to his property where, of necessity and in the very nature of things, substantial benefits have accrued by reason of the labor performed and the materials furnished by the contractor for the building."

But in this case one of the greatest difficulties the court met was in determining the requirements of the contract involved, determining just what class of workmanship and materials would satisfy the contract.

"Ordinarily, in this class of cases, where a contract is entered into for the erection of a building, the details are worked out through the medium of plans and specifications made a part of the contract, so that the kind and character of the completed structure called for can be readily ascertained.

"In the present case, about all the contract calls for in the way of a building is a two-story apartment house. The end contracted for seems to have been attained, although from the standpoint of the defendant (owner), not very satisfactorily. She complained of, and we think successfully proved at the trial of this case that the heating apparatus was inadequate to properly heat the building and that the roof badly leaked. According to the evidence, these defects were remedied at her own expense. . . . In this class of cases the law contemplates a substantial compliance with the plans and specifications; that any structure should be so substantially erected and completed as to subserve the purposes and uses for which it is intended. Otherwise the owner is not required to accept it and pay the contract price."

In passing, the court notes that the mere fact that an owner enters into possession of a building and uses it does not constitute such acceptance as waives a claim for damages resulting from the builder's failure to construct the work as required by the contract."

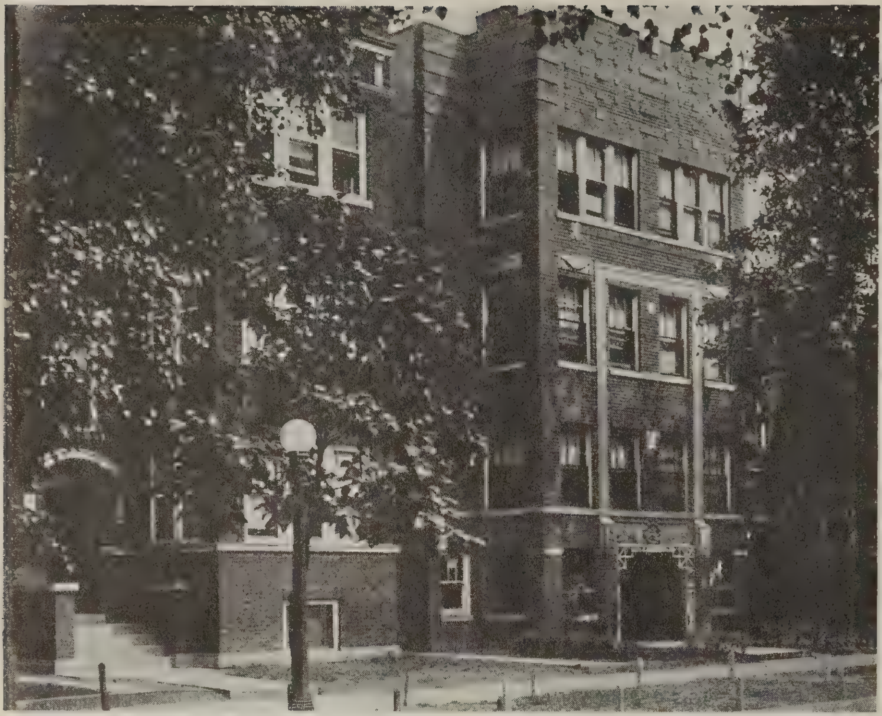
Recovery for Defectively Performed But Accepted Work

PLAINTIFFS sued to recover for work and materials furnished in installing plumbing and heating equipment in defendant's building in Detroit. There was a written contract for the main work, with a verbal agreement covering extras. Plaintiffs were prevented by defendant from completing the work. Defendant claims that he was justified in ordering plaintiffs to quit, on the ground that some of their work did not comply with the contract and had to be replaced, thereby costing defendant more than the contract price to finish the job.

Trial of the action resulted in judgment in plaintiffs' favor for the full contract price, less what the jury found it would have cost plaintiffs to complete the work had they been permitted to do so. Affirming this judgment, the Michigan Supreme Court says (Ginsberg v. Myers, 183 Northwestern Reporter, 749):

"In the written contract the plans and specifications were made a part thereof, and at the trial plaintiffs, when confronted with the specifications, claimed they were not bound thereby because they had never seen them. The trial judge was of the opinion that the point was well taken, but soon discovered his error and ruled that it did not make any difference whether plaintiffs had ever seen the specifications or not if they were made a part of the contract, and the court admitted the specifications in evidence and fully instructed the jury to the effect that plaintiffs were bound thereby. The error in the first ruling was amply corrected by the court.

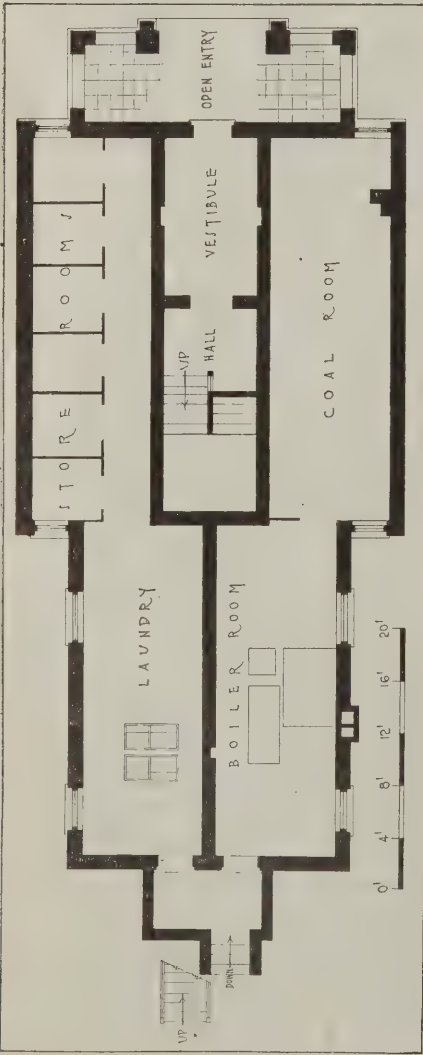
"The parties appear to have paid little attention to the specifications during the progress of the work performed by plaintiffs and the completion thereof by defendant. The questions of approval by the architect of work done by plaintiffs and the nature and extent of the work done by defendant after plaintiffs quit, whether in accordance with the specifications or more expensive, were all properly left to the jury."



Flat Building Suitable for a Narrow Lot

Six Three-room Apartments With Sun Parlor for Each

EDWARD A. BENSON, Architect

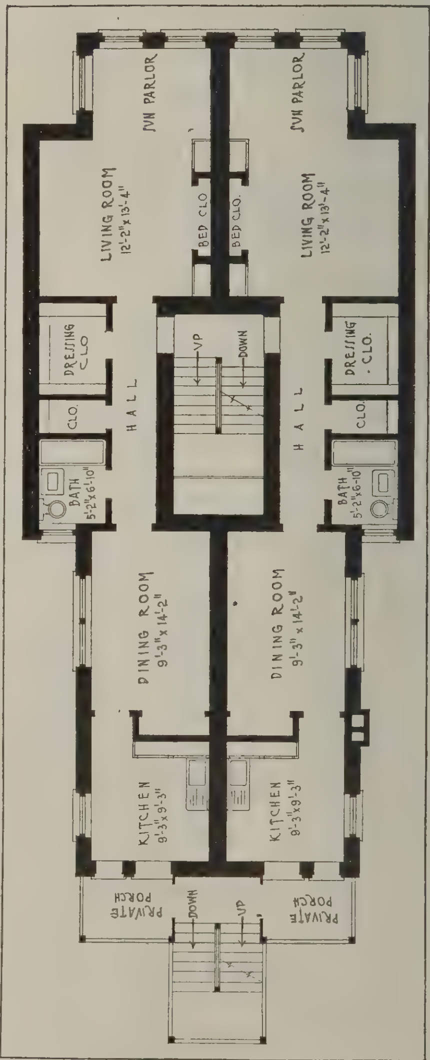


THE tendency in residential building today is toward a smaller number of rooms with sufficient building in equipment to permit an average family to live in comfort and within their means. In other words, houses and apartments are built in a very much more compressed way today then heretofore. People who have always thought that they could not get along with less than six rooms have suddenly found that three or four will do in a pinch. This applies not only to the large cities, but we find the demand for compressed homes has reached the small towns as well.

The flat building illustrated with this article consists of three floors with two apartments each—six apartments in all. Its total width is about 30 ft. and it is, therefore, suitable for using twelve families on a narrow lot.

One unusual feature of this building is that the basement floor is practically at the ground level. An entrance to the first floor is had through the vestibule and up a flight of stairs.

The typical floor plan shows apartments of three rooms each, besides a sun parlor, bath and dressing closet. The living room is converted into a bedroom at night by the use of an in-a-door bed. This particular apartment is located in Chicago and was designed by Edward A. Benson, Architect. In most localities such an apartment could be built at a cost of approximately $30,000.

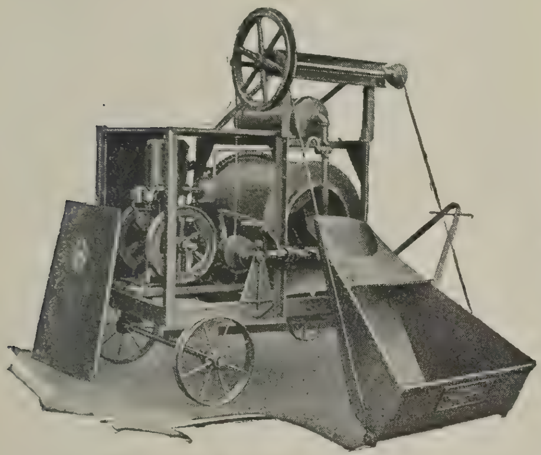


Improved Equipment for Builders and Contractors

Improved Concrete Mixer

THE Ransome "4-S" Improved Bantam Mixer, the latest Ransome development in small concrete mixers, is described in a new Bulletin, No. 108, recently published by the Ransome Concrete Machinery Company, Dunellen, N. J.

Like the earlier models of the well-known Ransome "Bantam" line, the Ransome "4-S" Bantam is designed to meet the requirements of the large number of contractors and others who can profitably use a mixer of relatively small capacity. To such contractors this new small mixer affords a simple, low-cost, light, easily portable machine, capable of handling a one-bag batch of any standard mix.



Ransome 4-S Improved Bantam Mixer

In addition to the general characteristics, possessed in common with earlier Ransome "Bantams" the new "4-S" Bantam has several special features of considerable importance to prospective buyers. Foremost among these are the adoption of gear drive, and an arrangement by which a three-point suspension of the drum proper is secured.

It will be noted that with the application of gear drive to these small mixers, Ransome engineers have followed the practice established in the design of the larger Ransome mixers.

A special point of interest in connection with the gear drive, introduced into the Ransome Bantam line by the new "4-S," is the use of the so-called Maag gears. Engineers will recall that the patented Maag design provides a gear with teeth that are shorter and thicker at the base than is the case with ordinary gears, and a pinion having teeth of the same shape as those of the gear, a design which materially reduces breakage leverage while adding strength. The line of contact on the flanks of Maag gear teeth is much longer than on the ordinary gear and greatly increases wear-resisting surface. At the same time the tendency to wear is lessened in the Maag tooth by its provision for a maximum of rolling contact and a minimum of sliding contact.

The three-point drum suspension referred to above, has in effect been secured by bringing the two back main rollers very near together.

It is claimed by the makers that with the adoption of gear drive with Maag gears, and the arrangement for this three-point drum suspension, the new 4-S Ransome Improved Bantam Mixer becomes the easiest running small mixer on the market.

A third feature particularly emphasized in Ransome literature is the use of aluminum patterns in making all castings for the 4-S Bantam. It is claimed that with these aluminum patterns smoother and more accurate castings are obtained, a result which of course promotes interchangeability of parts.

The capacity of the 4-S Ransome Bantam Mixer is specified as: Mixed concrete per bath, 4 cubic feet; unmixed material, 6 cubic feet; output per hour, 3-5 cubic yards.

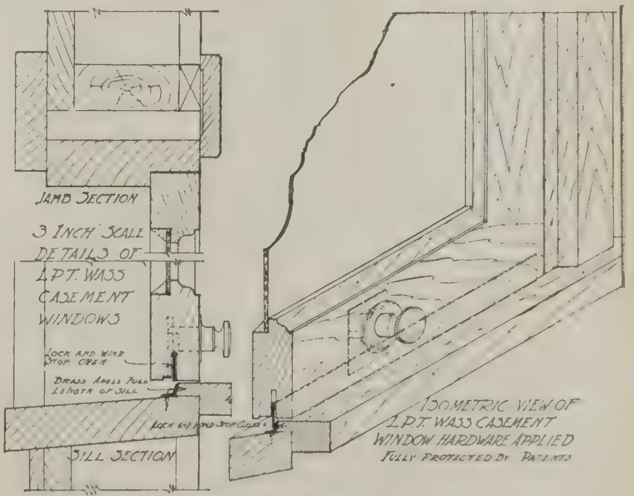
The machine is supported by a frame of channel sections mounted on a 4-wheel truck. Dimensions of frame, 76 x 36 inches.

The 4-S Ransome Improved Bantam Mixer is recommended by the manufacturer as particularly adapted for service on the smaller foundations, small culverts, mortar mixing when only a few masons are employed, and all similar classes of work for which small mixers are now so rapidly coming into general use.

Casement Window Hardware

CASEMENT windows are an attractive and useful feature in the well designed house. But windows, like doors, are useful only if their hardware is efficient. Locks that don't lock and hinges that don't last mar the service that such equipment should give.

The L. P. T. Specialty Co., Madison Terminal Building, Chicago, Ill., make a device for inswinging casement windows that locks and automatically seals the window in one operation. It prevents the seepage of rain, collection of dust and the usual cold drafts that are so apt to enter at the sill.


JAMB SECTION
3 INCH SCALE DETAILS OF L.P.T. WASS CASEMENT WINDOWS
LOCK AND WIND STOP OPEN
BRASS ANGLE FULL LENGTH OF SILL
LOCK AND WIND STOP CLOSED
SILL SECTION
ISOMETRIC VIEW OF L.P.T. WASS CASEMENT WINDOW HARDWARE APPLIED
FULLY PROTECTED BY PATENTS

New Lock and Seal for Inswinging Casement Windows

The illustration shows the application of this hardware to a casement window. The device has the added advantage of being easy to instal and costing no more than ordinary locks.

What the Editor Thinks

Public Works and Utilities

IN the opinion of the National City Bank, New York, the demand for great expenditures upon public works to give employment to labor at present wages is fundamentally wrong, and so is every artificial scheme to provide work at inflated costs. It is an attempt to evade and defeat the economic law. It assumes that society can lift itself by its bootstraps.

The cost of public construction would have to be defrayed by bond issues, which would mean more tax-exempt securities, more competition with bonds now outstanding and lower prices for them. It would mean heavier burdens for the taxpayers, and further depletion of the capital supplies from which the real revival of industry must come. Every such increase in the burdens upon industry, every move that wastes capital in uneconomic expedients, delays recovery.

The people who advocate such policies think they are dealing with a temporary situation, but this is not a temporary situation. Industry will not be self-supporting again until it is brought back into balance, so that the products of the workers in the various lines will be naturally exchanged and absorbed. When one-half of the population has had its compensation cut one-half it cannot afford to pay taxes to keep the other half employed at war wages.

It is a common saying that wages should not come down until the cost of living comes down—that wages should follow rather than lead in the decline. This is correct to the extent that wages are not themselves the cause of the high prices. But it is important to bear in mind that the "cost of living" is not a thing by itself. It consists of the compensation of all the people who do anything for us. One man's wage is another man's cost of living. The two things cannot be discussed separately.

Readjustment must come, in fact, is already here. Judge Landis' recent award in the case of the Chicago Building Trades sounds the death knell of war wages. Building operations in that city showed an immediate and surprising reaction.

"Take a Chance" Says Senator Calder

"CAPITAL must have faith enough in the country's future to take a chance; capital must start things moving and keep them going instead of holding back and letting the depression continue."

This is the remedy for the present unemployment problem, outlined today by Senator William Calder, of New York, "the world's biggest landlord." It is the remedy the coming Federal Congress of Unemployment will be forced to recommend if it intends to accomplish any real service to the 6,000,000 jobless men of the United States, Senator Calder said.

"I am practicing what I preach," Mr. Calder added. "I'm building houses. I know I'll eventually dispose of all of them at a profit. I'm just as sure of that as a man can be of anything. Everybody knows that the shelves in the stores of this country are getting emptier and emptier. They've got to be replenished some time. People are going on living, eating, wearing clothes, living in houses. Our country is not in a permanent decline. We can help ourselves to greater greatness, and the rest of the world to get on its feet if we will have faith enough in ourselves to go ahead. The men who have money ought to put it to work. Capital ought to take a chance, if necessary, and get the wheels moving. I predict this will be done before long."

Senator Calder contended that it was useless for Congress to try to cure unemployment by legislation. Conferences dealing with it in the abstract would accomplish little, he said, unless they were followed by some practical application of the lessons earned.

In Brooklyn, where he lives, Senator Calder has earned the name of "world's champion landlord" because he has built and rented more houses and apartments than anybody else. He says past experience has taught him that the expenditure of money for something that people must have is never a foolish investment.

General Business Outlook Healthier

AS to the future outlook, we have reason to be optimistic. The main item in holding back building has been the labor cost not only here but at the producing end. Mill localities are small, their labor market restricted, so that it is more difficult for them to reduce wages. But it is an unquestioned fact that wages and production costs in the building trades are being reduced all along the line. The U. S. Steel Corporation has announced a third reduction, bringing its common labor to 30c. an hour for a ten-hour day. The pre-war rate having been 20c. New York City common labor in the building trades is down to 60c. for an eight-hour day. In 1915 it was 25c. A $1 a day cut went into effect among the building trades in Westchester County, New York. Carpenters in Youngstown, Ohio, accepted a 20 per cent. cut, and Pittsburgh stone masons, planing mill men and pipe covers have accepted cuts ranging from 80 cents to $1 a day.

Unquestionably general business is improving. Certain industries that were the first and the worst sufferers are obviously on the mend with an upward trend to prices so that new business is being done at profit. We anticipate a similar situation in the building business by next spring at the latest, but to our mind the most unfortunate thing about the present situation is the attitude that some have of taking the slightest excuse to immediately boost prices beyond reason. This is only delaying improvement and killing the goose. We want better business and more business done at a profit, but it is more important to get the cost of production down to a modern level than to attempt to manipulate the market to a level of war time costs, which will only kill any building contemplated.

Wage Cut in New York

A REDUCTION of $1 a day in the wages of the building trades workers in Westchester County, New York, went into effect Friday, in pursuance to the arbitration award of Samuel Untermyer. A six weeks' strike was halted by the men when Mr. Untermyer acted as arbiter.

Review Building Situation

CONSTRUCTION activity in August, according to figures published by the F. W. Dodge Company, was 4 per cent. greater than in July and 9 per cent. greater than in August, 1920. Contracts awarded during August, 1921, in the twenty-seven Northeastern States of the country, amounted to $220,972,000.

Residential construction continues in the lead over all other classes of buildings. It accounted for 36 per cent. of the total in August, amounting to $80,329,000. Public works and utilities amounted to $44,797,000, or 20 per cent. of the total; business buildings, to $35,526,000, or 16 per cent.; educational buildings to $27,959,000, or 13 per cent.; industrial buildings to $10,832,000, or 5 per cent.

Contracts awarded for mercantile buildings in August amounted to more than for any previous month of this year.

The total volume of contracts let in the territory covered by the F. W. Dodge Company during the first eight months of this year has been 10 per cent. greater than the average for the first eight months of the preceding five years.

Contemplated new work reported from January 1 to September 1, 1921, has amounted to $3,202,731,000, which is more than double the contracts awarded in the same period.

A Summer Strike Makes an Idle Winter

Explaining to a representative of BUILDING AGE, why the outlook for building construction in Albany, N. Y., is not good, David H. Walsh, secretary of the Builders' Exchange of Albany, said: "The unwillingness of the unions of building mechanics here to accept a reasonable reduction in wages from the war peak is very largely responsible for the bad outlook for this coming winter. The masons alone accepted a reduction of $1 per day, which brought their wages down to $1 per hour. That was satisfactory to us.

"The result was that we declared for the open shop on the 1st of July, since which some labor has been available. But the general uncertainty as to labor cost has delayed the beginning of work till it is now too late to begin it this year. According to all calculations, there will not be much work for the building mechanics here this winter."

Utica, N. Y., House Builders Optimistic

BUILDING AGE finds much optimism existing among master builders of Utica, N. Y. C. W. Hill, president of the C. W. Hill & Co., real estate dealers, said: "A great many of the master builders of this city believe that the time is ripe for the building of frame houses. Quite a number are building houses costing from $5,000 to $15,000, and they are building them on the belief that they will have no trouble to sell them. One of our men in an automobile trip around the city counted in one hour 269 such houses. Lumber and carpenters' wages are quite satisfactory in price, which situation is having the above effect.

"It is being helped out by the fact that it is now becoming easy to finance the building and sale of such houses. One financial institution here is loaning up to 60 per cent. on first mortgage; most buyers can pay down a reasonable proportion of the cost; and the master builder or contractor is able to carry the second mortgage, which is to be paid off first."

The representative of BUILDING AGE investigated the books of the building commissioner of the city and found this: Permits for building frame houses issued in August, 1920, 31, with an estimated cost of $81,000. In August of this year the permits numbered 121, with an estimated value of $270,000.

The average estimated cost of these frame houses in August of last year was $2,612, and in August of this year, $2,314, a difference of $298 per house. Yet this difference has spurred the builders to activity.

The Labor Situation in Pittsburgh, Pa.

THE building trades strike situation is now in its eleventh week, with no breaks in the ranks of the employers.

Reports as to what the union men are doing drift in from time to time and we are informed that the men are now very anxious to return to work.

On Tuesday the Asbestos Workers and Pipe Coverers went back to work on the employers' terms, accepting 90c. per hour.

This now makes four classes of workmen who have accepted the employers' terms, namely: Stone Masons at $1 per hour; Planing Mill men at 80c. per hour, and Asbestos Workers and Pipe Coverers at 90c. per hour.

CONTRACTS AWARDED

	CLASS OF BUILDING						
Section of Country	Residential	Industrial	Business	Public Works and Utilities	Educational	Other	Total
New England	$ 7,075,500	1,234,500	$ 5,672,300	$ 1,973,900	$ 2,623,200	$ 1,980,300	$ 20.559,700
New York District	35,688,800	2,568,500	9,153,900	3,101,100	4,985,100	5,263,100	60,760,500
Middle Atlantic	11,043,700	1,861,400	5,521,900	11,692,700	5,601,800	2,192,000	37,913,500
Pittsburgh District	9,493,000	2,369,500	4,342,500	8,713,000	4,794,200	3,186,500	32,898,700
Middle West	14,261.000	2,415.000	9,786,700	17,148,000	9,016,500	7,617,800	60,245,000
Northwest	2,766,900	383,100	799,200	2,168,100	938,000	1,288,900	8,344,200
Total	$80,328,900	$10,832,000	$35,276,500	$44,796,800	$27,958,800	$21,528,600	$220,721,600

CONTEMPLATED PROJECTS

	CLASS OF BUILDING						
Section of Country	Residential	Industrial	Business	Public Works and Utilities	Educational	Other	Total
New England	9,712,400	$ 2,138,500	$ 4,606,800	$ 1,731,400	$ 2,224,000	$ 2,473,800	$ 22,886,900
New York District	48,714,300	3,522,000	11,145,500	17,005,500	12,252,600	5,914,100	98.554,000
Middle Atlantic	20,971,700	2,562,400	8,787,400	11,014,000	2,699,000	5,285,100	51,319,600
Pittsburgh District	15,739,400	28,374,500	12,582,600	29,242,100	2,786,000	8,300,500	97.025,100
Middle West	24,474,600	5,421,500	15,231,200	18,079,500	9,632,000	9,249,500	82,088,300
Northwest	2,970,900	712,000	1,088,200	4,933,800	1,018,500	1,046,500	11,769,900
Total	$122,583,300	$42,730,900	$53,441,700	$82,006,300	$30,612,100	$32,269.500	$363,643,800

Trend of Material Prices

THE following are wholesale prices of basic building materials in the three markets which set prices for the rest of the country.

These prices are presented to show the trend of the wholesale market, which forecasts prices in the retail market. They are not prices which the average contractor can buy at, but are quoted to show him the movement of materials so that he can buy to better advantage.

Followed in conjunction with the Review of Building Conditions, these prices will prove invaluable.

All prices are for carload lots, F. O. B. market quoted, unless otherwise noted.

NEW YORK PRICES

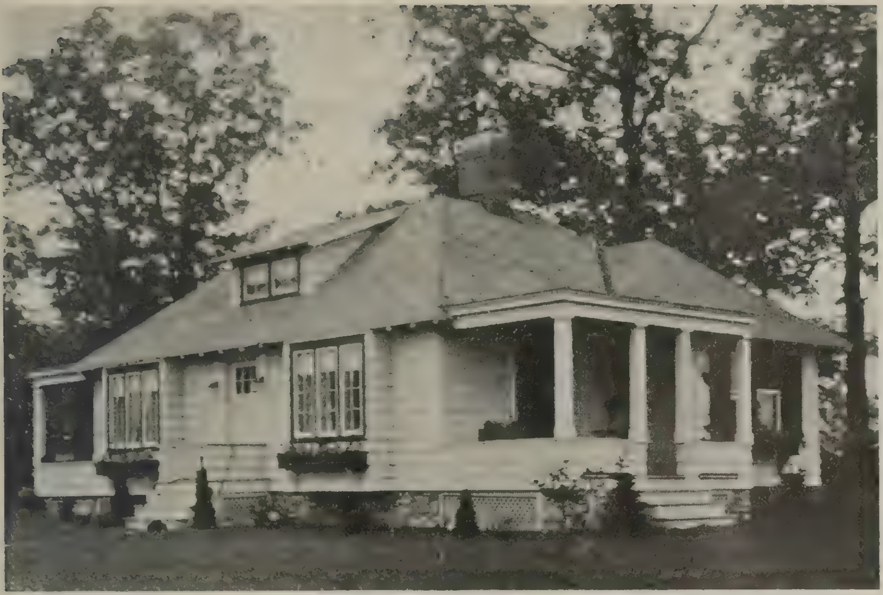
	Aug. 19	Sept. 23
LONG LEAF YELLOW PINE		
B. and Better Flat Grain Flooring, 2½" Face	$54.00	$56.50
Dimension, S1S1E, No. 1 Common, 2x4", 10'	38.00	38.00
Timbers, Merchantable, '05, 12x12", 10 to 20'	47.00	47.00
B. and Better Ceiling, ½x3¼	36.00	36.00
B. and Better Finish, 1x4"	51.00	56.00
No. 1 Common Boards, 1x8"	40.00	40.00
NORTH CAROLINA PINE—		
No. 2 and Better Flooring, 13/16x2½"	$55.00	$56.00
Roofers, 13/16x5½"	26.50	26.50
DOUGLAS FIR—		
No. 2 Clear and Better V. G. Flooring, 1x3"	$75.00	$75.50
No. 1 Clear V. G. Flooring, 1x4"	.....	74.00
No. 2 Clear and Better Ceiling, ⅝x4"	35.00	36.00
No. 2 Clear and Better Novelty Siding, 1x6"	42.25	44.00
No. 2 Clear and Better V. G. Stepping	87.00	87.00
Dimension, S1S1E, 2x4", 16'	40.00	40.00
Timbers, S1S1E, 12x12", 16'	50.00	54.00
WESTERN RED CEDAR—		
B. C. Perfection Shingles, per M	$7.45	$7.25
Washington Perfection Shingles, per M	7.15	7.00
Clear Bevel Siding, 1½x6"	45.00	44.50
CANADIAN SPRUCE—		
No. 1 Lath, 1½"	$8.50	$10.00
Dimension, 2x4", 10 to 16'	48.00	36.00
HARDWOOD FLOORING—		
Clear Quartered White Oak, 13/16x2x2¼"	$148.75	$137.50
Clear Plain White Oak	108.75	97.50
Clear Maple, 13/16x2¼"	96.50	96.50
Clear Quartered White Oak Parquetry Strips, 5/16x2"	143.50	142.50
Clear Plain White Oak Parquetry Strips	99.00	87.50
(All lumber prices furnished by LUMBER)		
COMMON BRICK—		
Per M. f. o. b. job	$18.40	$18.40
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers, f. o. b. dock	$2.40	$2.40
STRUCTURAL STEEL (IRON AGE)—		
Cents per lb. to large buyers	2.23	2.23
CRUSHED STONE (cu. yd.)—		
¾ in.	$2.65	$2.60
1½ in.	2.50	2.45
WALL BOARD—		
Per 1,000 sq. ft. in lots under 1,000 sq. ft.	$52.50	$52.50
Per 1,000 sq. ft. in lots 1,000 to 2,500 sq. ft.	47.50	47.50
METAL LATH—		
2.3 lb.—warehouse price per 100 sq. yd.	$22.64	$22.64
2.8 lb.—warehouse price per 100 sq. yd.	26.60	26.60
3.4 lb.—warehouse price per 100 sq. yd.	29.33	29.33
Add 5 cents per sq. yd. for galvanized.		
LIME (Hydrate)—		
Finishing, per ton	$26.00	$26.00
Masons, per ton	20.50	20.50
SAND AND GRAVEL (cu. yd.)—		
Sand	$1.60	$1.60
¾ in. gravel	2.85	2.75
1½ gravel	2.85	2.75

CHICAGO PRICES

YELLOW PINE—		
Boards, 1x8, No. 1 Com	$32.00	$33.50
Casing and Base, 4-6 in.	55.00	58.00
Ceiling, ⅝x4, B. and Btr	36.00	36.50
Dimension No. 1, 2x4, 12 to 14 ft	30.00	40.00
Drop Siding, 1x6, B. and Btr	38.00	38.00
Finish, 1x4, B. and Btr	50.00	51.00
Flooring, B. and Btr. E. G., 1x3	70.00	74.00
Flooring, B. and Btr. F. G., 1x3	47.50	50.00
Lath, 4 ft., No. 1	5.90	6.90
Timbers, Long Leaf No. 1, 10-20 ft., S4S, 6x12 to 12x12	39.00	39.00
NORTHERN HEMLOCK—		
Boards, No. 1, 8 to 16 ft., 1x6 to 8 in.	$30.00	$29.00
Lath, 4 ft., No. 1	9.25	9.25
DOUGLAS FIR—		
Boards, No. 1, S2S, ¾ in., 1x8 to 10 in.	$28.75	$27.75
Dimension, No. 1, S1S1E, 8 ft., 12 ft., 14 ft., 2x4 in.	29.00	29.60
Drop Siding, 1x6 Pat. 106, No. 2, C. and Btr	35.50	38.50
Flooring V. G., 1x4, No. 1	65.50	66.50
Lath, 4 ft., No. 1	7.40	9.60
Timbers, No. 1 Com., 12x12 in. and under, 40 ft. and under, rough	36.00	37.00
HARDWOODS—		
Maple Flooring, 13/16x2¼, clear	$94.75	$94.75
Oak Flooring, 13/16x2½, Cl. Pl., White	104.00	104.00
REDWOOD—		
Bevel Siding, S1S1E, 10 ft., 20 ft., ½x4, clear	$38.25	$38.25
Finish, S2S or S4S, 1x6 to 8 in.	91.50	91.50
WESTERN RED CEDAR—		
Bevel Siding, ½x4 in., Clear	$42.00	$42.00
Shingles, Extra Clears, 16 in.	4.06	4.65
COMMON BRICK—		
Per M. f. o. b. job	$12.00	$12.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers	$2.17	$1.97
STRUCTURAL STEEL—		
Cents per lb. to large buyers	2.23	2.23
CRUSHED STONE (cu. yd.)—		
¾ in.	$2.25	$1.75
1½ in.	2.10	1.75
WALL BOARD—		
Per 1,000 sq. ft. in lots under M	$57.50	$57.50
Per 1,000 sq. ft. in lots 1 M to 2½ M	52.50	52.50
SAND AND GRAVEL (cu. yd.)—		
Sand	$2.50	.....
¾ in. gravel	2.50	$1.75
1½ in. gravel	2.50	1.7[illegible]

ST. LOUIS PRICES

YELLOW PINE—		
Boards, B. and Btr., E. G., 1x3	$68.00	....
Ceiling, ¾x3¼, B. and Btr	41.00	$45.00
Dimension, No. 1, S1S1E, Short Leaf, 2x4 in., 12 & 14 ft.	27.50	26.50
Finish, S2S, B. and Btr., 1x4	45.00	50.00
Flooring, B. and Btr., E. G., 1x3	68.00	73.00
Flooring, B. and Btr., F G., 1x3	47.00	52.00
Lath, 4 ft., No. 1	5.70	6.30
Timbers, No. 1, rough, short leaf, 6x12 to 12x12 in., 18 to 20 ft.	32.00	33.00
DOUGLAS FIR—		
Ceiling, F. G., ⅝x4 in., No. 2, Cl and Btr	$30.25	$31.25
Dimension, No. 1, S1S1E, 2x4 in., 8, 12, 14 ft.	30.00	29.00
Drop Siding and Rustic, 1x6 in., No. 2, Cl and Btr.	35.50	38.50
Finish, F G., S2S or S4S, 1x4 in, No. 2 Cl. and Btr.	65.25	65.25
Flooring, 1x4 in., No. 1, Cl., V.G.	65.50	65.50
Stepping, V.G., 1¼x10 in. & 12 in., No. 2, Cl. & Btr.	77.75	77.75
CALIFORNIA REDWOOD—		
Finish, S2S, Cl., 1x6 in.	$91.50	$81.50
Siding, 4 in. Bevel, 10 to 20 ft.	38.25	38.25
8 inch Colonial	66.75	66.75
8 inch Bungalow	68.75	68.75
HARDWOODS—		
Maple Flooring, 13/16x2¼ in., Clear	$91.75	$91.75
Oak Flooring, ⅜x1 and 2 in., Clear Qtr. White	110.00	110.00
RED CEDAR—		
Siding, ½x6, Clear	$41.00	$41.00
Shingles, Clears	4.16	4.91
COMMON BRICK—		
Per M. f. o. b. job	$17.00	$17.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers	$2.50	$2.50
STRUCTURAL STEEL—		
Cents per pound to large buyers	2.325	2.325
CRUSHED STONE (cu. yd.)—		
¾ in.	$1.825	$1.825
1½ in.	1.825	1.825
WALL BOARD—		
Per 1,000 sq. ft. in lots under M	$57.50	$57.50
Per 1,000 sq. ft. in lots 1 M to 2½ M	52.50	52.50
SAND AND GRAVEL (cu. yd.)—		
Sand	$0.95	$1.40
¾ in. gravel	0.95	1.40
1½ in. gravel	0.90	1.35
(Following prices are F.O.B. factory.)		
FACE BRICK—		
Harvards	$38.00	$38.00
Tapestry	30.00	30.00
Caledonian	26.00	26.00
Smooth Grey	35.50	35.00
Fisk Lock	35.50	35.50
SHINGLES (per square)—		
Asphalt single	$6.40	$6.40
Asphalt strip	5.75	5.75
STAINED WOOD—		
16 in. extra clear	$9.75	$9.75
18 in. Eureka	10.50	10.50
18 in. Perfection	11.50	11.50
18 in. Royal	11.40	11.40
24 in. Imperial	12.00	12.00



House of Mrs. Burgen, Tuckahoe, N. Y.
Van Evelyn Corporation, Builders

Attractive Layout for Five Room Bungalow

ONE is so accustomed to seeing houses built on the long and narrow plan, from back to front, that when one is presented in which the chief features occupy the sides, it is something worthy of note. Most houses have small living rooms and dining room cramped side by side facing the front of the building. This one has these rooms running the length of the house instead of the width, and larger, airier rooms are thereby made possible.

A good feature here is the fact that the living room may be entered from the street through two doors on different sides of the house. It is too often true that the living room occupies the whole front of the house, and the one entrance, opening directly into it, necessitates the help traversing the living room and intruding at undesirable psychological moments. The side elevation is symmetrical, and gives the impression of spaciousness. The well placed window boxes under the dining room, living room and bedroom, as well as the flower boxes and hanging baskets on each porch, give that touch of color and refinement that requires so little and gives so much in return. The lantern fixtures at either side of the door are a pleasing feature. The casement windows are grouped so as not to break up the wall space unduly, and their small panes give a sense of scale to the little house.

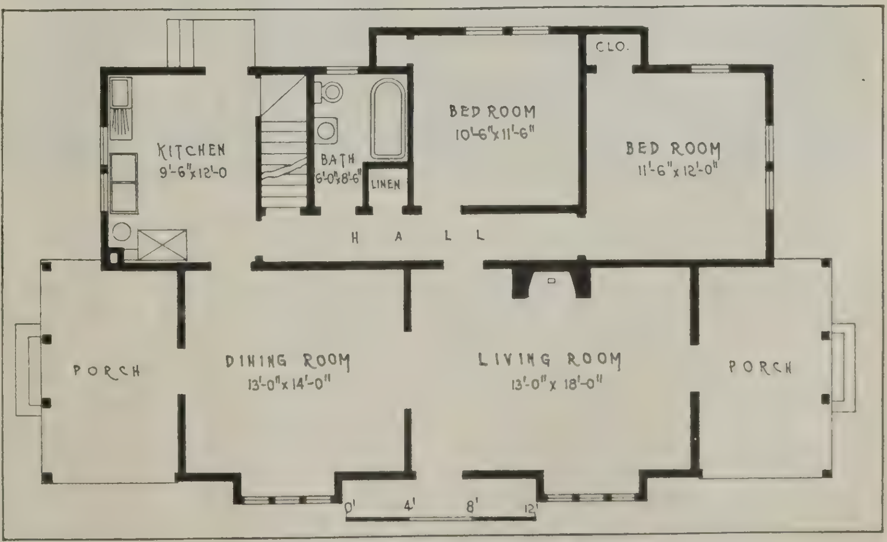
Coming indoors, we find intercommunication between the rooms is logical and easy. The kitchen utilities have been grouped on two sides of the room, leaving place on the other two sides for cabinets and tables. Doorways in bedrooms and kitchen have been placed where they do not waste the wall space. Each bedroom has its closet, and a linen closet has been well placed near both bathroom and bedroom. Two chimneys are required by this plan, one for the fireplace in the living room, and one in the kitchen.

All told, the house has much to commend it in livablenes and convenience. It is unusual to see a little dwelling of this size, possessed of two porches of such fair proportions. One can readily imagine all the added comforts that a dining porch provides. A place to breakfast and to have light meals, in addition to the usual activities that may well go forward on any general porch. It makes possible an outdoor place for the children to play where they will be safe and yet not disturb the adult porch activities of the grown people in the household.

In fact, this double porch arrangement rather stimulates a desire to have them whenever possible, just as many families have luxuriated in sleeping porches and other upstairs porches. The dining porch is an attractive feature achitecturally, serving to balance the similar projection on the other side of the house, and making a good detail.

The materials used in the exterior of this place are well adapted to its purpose. The roof line has variety and the structural placing of the little window in the attic is a factor in this result.

When one reflects that this attractive dwelling cost only $7,000, it no longer seems necessary for people to herd in miserable crowds without any of the pleasures of the out of doors. An example like this is one that can be readily duplicated with such modifications as individual needs demand, and real comfort may be had where now there are only unfulfilled wishes.



Floor Plan Provides for Privacy of Bedrooms from Rest of House

Judge Landis Gives Chicago Building Trades Twelve and One-Half Per Cent Cut

Jurisdictional Disputes Eliminated—No Restriction on Amount of Work Men May Do; Nor Against Use of Machinery on Job

THIS is an arbitration of wage differences between employers and employes in building construction. The agreement was entered into between The Building Construction Employers Association, The Associated Builders, and the Chicago Building Trades Council after several weeks of idleness in the industry, and authorized the undersigned as umpire, to fix the wages to be paid in the several trades represented, the award to become effective when made and remain in force until May 31, 1922. It was also agreed that on or before February 1, 1922, the umpire shall determine the rates to control from May 31, 1922, for the period of one year. Further there was a provision that the principles and conditions of all trade agreements shall be made as nearly uniform as possible, and the parties stipulated that should any trade arbitration board be unable to agree upon any provisions of their agreement involving conditions, working rules, etc., such dispute should be submitted to the umpire for his final decision. This latter provision was most important, for it put it in the hands of either the employer or the employe to free any trade from all detrimental working rules and conditions by the simple process of withholding assent to such provisions.

Photo by Underwood & Underwood

THAT THE DECISION RECENTLY HANDED DOWN BY JUDGE LANDIS WOULD START a building boom in Chicago was plainly indicated when almost every contractor having buildings under construction doubled their force of men, and expect to absorb the greater part of idle labor at once so as to complete all buildings before the winter season sets in. The photograph shows a bungalow being constructed at Chicago Heights by Frederick K. Bartlett & Company. When Judge Landis handed down his decision three men were working on this building. The following day nine started and fifty additional men were put to work on another building in the immediate vicinity the next day.

It is the violation of no confidence to say that building construction had gotten into bad repute in this community. There was a general disposition to keep away from it as a thing diseased. Capital avoided it. The wise dollar preferred most any other form of activity, or no activity. And this applied to the whole range of building construction from the cottage to the sky-scraper. This attitude of the public added to the profound commercial and industrial depression generally existent resulted in a virtual famine in housing accommodations and brought about the idleness of many thousands of men willing to work. It was in view of these conditions that the umpire conceived it to be his duty to aid these parties to rehabilitate the industry in the esteem of the public, the great unrepresented party to this arbitraion, but nevertheless the one upon whom the consequences of the award would fall.

This loss of the public faith was not due entirely to the wage question. The mere making of a wage award would not have placed the industry on solid ground. Reliable testimony showed that a 20 per cent. reduction in wages, other conditions remaining the same, would produce but a six or seven per cent. reduction in building cost. The real malady lurked in a maze of conditions artificially created to give the parties a monopoly and in rules designed to produce waste for the mere sake of waste, all combining to bring about an insufferable situation, not the least burdensome element of which was the jurisdictional dispute between trades members of the same parent organization.

It is not possible that all has been done that might have been done, nor that no errors have been made in these agreements, but it is my judgment that the numerous corrective provisions that have been included in the more than 40 trade agreements, if carried out in good faith, will produce savings and economies to the public far greater than would have resulted from a 20 per cent. wage reduction, other factors and conditions remaining the same.

Some of the trades, such as the carpenters, plasterers and painters have seen fit to hold aloof from the arbitration. Therefore in applying a wage scale to the new conditions of the trades that are here, I do so with the distinct understanding that those trades that have refused to come in and revise their agreements along just and reasonable lines as most of you have done, will not receive your support of their wasteful and subversive practices, for this would be to permit them to capitalize your good work to their advantage and to your detriment. The highest dictates of both morality and interest require that you adopt and adhere to this policy. To illustrate what I have in mind in this connection I refer you to the window glass industry, said to be controlled in Chicago by six firms. The representative of the Pittsburgh Plate Glass Company and the president of the Glaziers' Union appeared here in behalf of this trade and insisted upon a working agreement containing a provision that no glazing should be permitted to be done in the shop; that it should all be done on the building or job. This attitude of these two interests was plainly hostile to the public welfare, particularly the owners of small homes. Certainly that trade has no call on you to support it in that unconscionable practice.

You have made what is called the "uniform agreement" applicable to all trades. Each separate trade agreement expressly adopts this uniform agreement and provides that it shall control as against any conflicting working rule. In carrying out the declared purpose of preventing strikes and lockouts and other waste and avoidable expense, annoyances and delays, and for the purpose of making building costs as low, stable and certain as possible, consistent with fair wages, this uniform agreement provides for the peaceful adjustment of disputes by arbitration, subject for appeal to the National Board for the National Board for Jurisdictional Awards, with whose decisions all parties agree to comply; that you will not stop work individually or collectively under penalties prescribed, except only when an owner attempts to construct a building with non-union men while putting up another building on which you are employed, and when the employer fails to pay employes for work done; that in case of scarcity of help non-union men may work with union men until such time as union men may be obtained; that any journeyman may use in his work the tools of any other trade; that small tasks of not over thirty minutes duration in any one day belonging to any trade may be performed by any other trade at the discretion of the employer; that over-time work during two and one-half hours beyond the regular working day shall be compensated at one and one-half times the regular wage; that over-time work beyond this, and work performed Saturday afternoon, Sundays and holidays shall be paid at double the regular rate; that shift work will be paid at the regular rate; that contractors not affiliated with these associations may avail themselves of all benefits of these agreements by either joining the association or paying the regular dues and fees that members pay; that the union will provide them to any contractor, whether a party to any agreement or not, under the rules and at the wage provided in these agreements.

It is further expressly agreed and stipulated that there shall be no restriction as to the amount of work a man may do, nor against the use of machinery, methods or appliances, nor against any raw or manufactured material except prison made. Employers may employ or discharge whomsoever of the union they please, and employes may work for whomsoever they see fit, and the foreman, if any, is to be exclusively the agent of the employer.

Each of that group of trades that have entered into agreements with the Associated Builders and sixteen of those that have signed up with members of the Building Construction Employers Association agree that nothing shall prohibit an employer or one member of a firm of contractors from working on his or their own jobs. Employers and employes of some trades acting in cooperation have refused to the public the benefit of the economy that would result from the operation of this provision, and three trades require work to be done by skilled men that laborers or helpers might do. Therefore, in fixing the wage in these trades I have been obliged to consider the waste thus occasioned. If at any time before November first next, any of these unions notify me of their willingness to change their attitude in this respect I will advance their wages accordingly as the rule is applied in the present award to other trades.

It is a matter of very deep gratification that all trades have eliminated jurisdictional matters by providing that "all work undertaken by the parties of the first part (the employer) shall be done by the parties of the second part (the employes) subject to the decisions of the National Board for Jurisdictional Awards," thus making the employer responsible for the kind of work he may contract to do and placing on him the initiative for settling disputes between unions as to the kind of labor they shall perform according to the provisions of the uniform agreement and reference to the National Board for Jurisdictional Awards.

The wages in force at the time work was stopped in May were $1.25 per hour for skilled men and $1 per hour for common labor. These rates had been obtained in Chicago during 1920 and apparently had been originally fixed in total disregard of skill, hazard, length of apprenticeship, and necessary loss of time due to weather and seasonable demand. Theretofore in Chicago and elsewhere these considerations had influenced and controlled the matter as they have since and do now in other localities. Manifestly this theory was fundamentally erroneous and in violation of the principles heretofore announced in this proceeding. Having in mind these principles the rates of the highest skilled trades such as the bricklayers have been reduced approximately 12½ per cent. below the rate of 1920 and the wages for all other trades have been scaled accordingly. While it may be true that since the existing scale was fixed living costs have been reduced approximately 20 per cent. and that the rates here announced may impress persons unfamiliar with these trades as high when compared with wages paid in other industries it must be remembered that in the building trades workers are limited by weather conditions and other causes to from 150 to 200 days work per year.

	Per Hour
Plumbers	$ .95
Bricklayers	1.10
Boilermakers	1.10
Steamfitters	.95
Hoisting Engineers—(For operation of high pressure boilers and engines, cable ways, derricks, pile drivers, cranes and cable hoists	1.10
Hoisting Engineers (all others)	.85
Tile Layers (fire proofers)	1.12½
Cenement Finishers	.85
Composition Floor Finishers	.97½
Cement Workers (Laborers, Local No. 76)	.72½
Stone Derrick Men	.90
Drain Layers	.82½
Electricians	1.10
Gas Fitters	.95
Ornamental Iron Workers	1.05
Structural Iron Workers	1.05
Common Laborers	.72½
Caisson Men (windless and niggerhead men)	.85
Caisson Men (diggers and laggers)	.97½
Laborers (plasterers)	.78¾
*Excavating Labor (Local No. 225)	.47½
*Excavating Labor (Wall Men, Local No. 225)	.55
Composition Floor Laborers	.72½
Lathers	1.00
Machinery Movers and Riggers	.85
Marble Setters	.87½
Marble Setters Helpers	.70
Marble Rubbers and Polishers	.75
Scagoliola Rubbers and Polishers	.75
Mosaic and Tile Workers	1.02½
Mosaic and Tile Helpers	.70
Pipe and Boiler Coverers	.95
Composition Roofer Teamsters	†30.00
Slate and Tile Roofers	1.00
Stone Cutters	1.02½
Stone Carvers	1.25
Stone Planer Men	.82½
Terrazzo Mechanics	.95
Terrazzo Mechanics' Assistants	.80
Terrazzo Helpers	.70
Tuck Pointers	1.00
Composition Roofers	92½
Sprinkler Fitters	.92½
Sprinkler Fitters' Helpers	.70

---

* These rates are fixed in accordance with express agreement between employer and employee.

† Per week.

The following trades are not in this arbitration: Carpenters, Elevator Constructors, Plasterers, Sheet Metal, Painters, Glaziers, Fixture Hangers.

Early in the arbitration a tentative carpenters' agreement was submitted. That document is at variance with the new uniform agreement in several particulars. It provides double time for all over-time; it requires eight hours pay for seven hours work shift time; the work covered by the agreement harbors jurisdictional disputes with other trades, it provides that should any other trade under control of the party of the first part do any work claimed by the carpenters then that work shall cease until the matter is taken up by the Joint Arbitration Board.

Should this agreement be re-written according to the uniform agreement, uniform suggestions and principles the wage would be fixed on the same scale as others at $1 per hour.

If an agreement had been submitted by the elevator constructors in harmony with the uniform agreement, uniform suggestions and principles an award would have been made of 95 cents per hour.

The plasterers are not in the arbitration. Early in the proceeding a document expressing the agreement of the parties were presented for the *advice* of the umpire respecting legal questions. That document has few of the safeguards of the uniform agreement. In it are many provisions designed to produce waste, increase cost and monopolize the business. The foreman is made subject to union rules; rules are laid down to be obeyed by property owners contracting with plastering contractors; it assumes to extend the plasterers' jurisdiction beyond the fair limits of the trade; it requires an employing plasterer to register with the union semi-annually and union men may work for no contractor not thus registered. The effect of the foregoing is to subject the public to union rules apparently in exchange for the power of the unions in forcing "all plastering regardless of the nature of the structure" into the employers hands.

The foreman is required to ascertain whether employes are in good standing in the union and to collect fines and dues for the union by withholding money from wages due for work. Over-time is fixed at double the regular rate of $2.50 per hour and the agreement provides that continuous over-time (apparently shift time) shall be given to those not regularly employed. The agreement limits to union men the right to use tools, thus prohibiting any employer from even doing patch work on his own job. It is required that all cast work except in limited amount must be done at the building by members of a sister union. It also required that ornamental plastering shall be contracted for by the employing plain plasterer under penalty; that a plasterer will not work on the building where the ornamental plastering is let to another con-

(*Continued on page 66*)

How to Frame Gambrel Roof

(*Continued from page 36*)

from the plumb line *A*, the run of the rafter (7¼″). Produce the plumb line *T*. From this length must be deducted one-half the thickness of the ridge (3/16″). Measure 3/16″ forward on a level line from the line *T*, and produce the plumb line *D*. The lower end of the rafter is notched over the upper plate making a strong and rigid brace. Measure in on a level line from the first plumb line *A*, the width of the upper plate (⅞″). Produce to the plumb line *B*. From the point where the plumb line *A* intersects the top edge of the rafter, produce a level line until it cuts the plumb line *B*, as at *G*. Cut on the lines *G* and *B* for the notch over the upper plate and on line *D* for cut against ridge.

Jack rafters 2, 3 and 4 are laid out in the same way as common rafter 1, since they are each a part of the length of rafter 1. Take the runs from the layout (Fig. 1), measuring from the center of the ridge to the center of the valley. The three rafters are shown developed on the side of a single rafter (Fig. 8). In practice these would be laid out separately. Press the fence firmly against the top edge of the rafter and produce the first plumb line to the extreme left as at *C* (Fig. 8). Slide the fence to the right, measuring on a level line the runs of the rafters (6″ for rafter 2, 4″ for rafter 3 and 2″ for rafter 4). From this length must be deducted one-half the thickness of the ridge (3/16″). Measure 3/16″ forward on a level line from the plumb line *T*, and produce the plumb line *D*. The lower ends of the rafters are beveled to make a fit against the sides of the valleys. From the extreme length obtained with the square (which is to the center of the valley), must be deducted one-half the thickness of the valley (measured on the line of the jack rafter), or ½″, full. Measure this distance back on a level line from *C*, on the side of the rafter (Fig. 8), and produce another plumb line, as at *D*. Square this line across the top edge and locate the center. To lay out the top cut so that the jacks will fit against the side of the valley at the proper angle, measure forward on a level line from the plumb line *D*, one-half the thickness of the jack rafter (or 3/16″). Produce the plumb line 1. Connect the plumb line 1 through the center line *D*, as shown on the top view (Fig. 8). The top cut can also be laid out with the steel square by using the length, 13⅞″ (bridge measure of the run, 12″, and the rise, 7″), on the blade and the run, 12″, on the tongue. Mark on the length for the top cut. Cut on the plumb line *D* for the cut against the ridge; and on the plumb line 1, on bevel 2 for the cut against the valley.

The constant unit of 17″ run is the same for the upper as for the lower valley rafter. The rise is the same as that used for the common and jack rafters (7″). Set the fence and square at 7″ rise on the tongue and 12″ run on the blade. Mark on the tongue for all plumb cuts and on the blade for all level cuts. Press the fence firmly against the top edge of the rafter and produce the first plumb line to the extreme left (*A*, Fig. 9). Slide the square to the right, measuring on a level line, from plumb line *A*, the run of the rafter (10⅜″, taken from the layout, Fig. 1). This distance is measured from the outer edge of the upper plate to the center of the ridge, on the line of the valley rafter. Produce plumb line *T*. From this length must be deducted one-half the thickness of the ridge (measured on the line of the valley rafter), or ½ the diagonal thickness of ⅜″, or ¼″. Measure ¼″ forward on a level line from *T*, and produce plumb line *D*. Square this line across the top edge of the valley. To make a fit at the intersection of the two ridges, measure forward on a level line from *D*, one-half the thickness of the valley and produce the plumb line 1. Connect the two outside points with the center as shown on the top view (at 2, Fig. 9). The top cut can also be laid out with the steel square by using the length, 9⅛″ (bridge measure of the run, 17″, and the rise, 7″), on the blade and the run, 8½″, on the tongue. Mark on the length for the top cut. For convenience use one-half the run, 8½″, and one-half the rise, 3½″, giving the bridge measure, 9⅛″. From the intersection of line *A* and the top edge of the rafter, produce a level line (as at *G*), locating the plate level. Cut on the line *G* for the plate level; on the plumb line 1 on bevels 2 for the ridge cut.

The run of the ridges is taken from the layout (Fig. 1). For ridge *C*, measure the extreme length of the roof from wall to wall, or 2′ 8″. For ridge *D*, measure from the center of ridge *C*, to the facia line, or 11½″. From this length must be deducted one-half the thickness of ridge *C*, or 3/16″, making a net length of 11 5/16″. Assemble the rafters as shown in the elevation (Fig. 10). Set up the two ridges first, securing them in place with the common rafters. Fasten the valleys in next, keeping the center lines of the valleys in alignment from the facia line to the ridge, fastening the jack rafters in last.

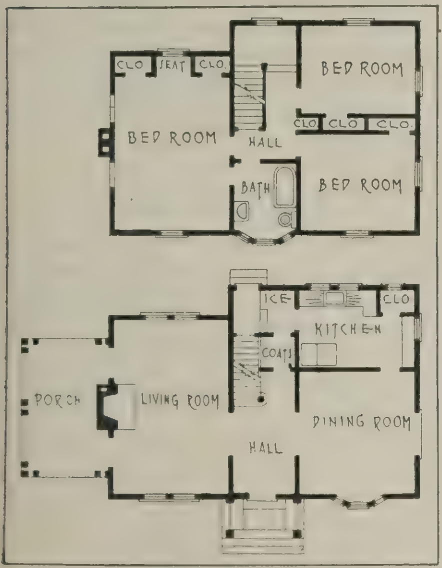
The runs are taken from the layout (Fig. 1). The lengths should be developed with the steel square. The measurements are taken on the center line on the top edge of the rafter and are listed in the accompanying table, as in trade practice, full size, without deductions. Where rafters intersect a ridge, make allowances or valley for the cutting length. If a model is made for practice to the same scale as the layout, read the measurements in the table as inches. For example, rafter 1, the run would read $7\frac{3''}{12}$ and the length $8\frac{4\frac{1}{4}''}{12}$. The square being laid out in twelfths-of-an-inch, it is an easy matter to check up the work accurately.

The House On Our Front Cover

THE house illustrated on the cover of this issue is located at Malba, Long Island, and was built together with a number of other houses as a speculative proposition It was necessary, therefore, that the plan be a very practical one and that the construction of the house be simple and economical. In other words, the house must be suited to the needs of the average small family. The plan is practically square and provides for three large rooms and reception hall on the first floor. The center hall is always an attractive feature. In this case there is a large living room with open fireplace on one side and with dining room on the other.

Dutch Colonial House at Malba, Long Island.
H. P. Knowles, Architect.

The second floor provides for three bedrooms. A large bedroom right over the living room has two closets, one on either side of the window seat. Two smaller bedrooms are on the other side of the house, each having a large closet. There is a linen closet in the upper hall and a large bathroom is easily accessible to all of the bedrooms, in fact, it connects with the large bedroom by a private door. The large bedroom, naturally, is intended for the owner and the smaller bedrooms for the children and guests. The Colonial entrance is an attractive feature of this house, with its simple and pleasing design of columns and lattice. The Colonial atmosphere is further carried out in the fan shaped light over the door.



Floor Plans

The whole atmosphere about the house is entirely in keeping with the country surroundings.

No pantry has been provided on the first floor. Instead, cupboards are located in the kitchen to serve the purpose of a pantry. The refrigerator is placed in the rear entry.

One rather unusual feature in the layout of the first floor is that the passage from the reception hall to the rear of the house is through a closet which may be used for coats, hats, etc. There is another closet on this floor in the corner of the kitchen, which serves the purpose for brooms, mops and the like.

How Progress Chart Reduces Building Costs

(Continued from page 23)

trolling a building operation results in "a very material saving" on the total cost of an operation. To get a clear conception of the way cost can be reduced by means of the chart it is necessary to state briefly its use.

At the start of each operation it is scheduled on a chart which gives specific dates for the completion of al' the steps comprising the job. Such a schedule must, of course, be prepared by one who is widely experienced and familiar with general conditions as well as the features peculiar to each project. The typical progress chart includes such items as "temporary quarters," "demolition," "structural steel," "masonry," "cut stone," "carpentry," "hardware," "plumbing," "heating," "electrical installation," "floor coverings," "lighting fixtures," etc., clear through to the end.

In addition to the specific dates for the completion of the various stages mentioned, the progress chart carries delivery dates for all manufactured articles which are to go into the completed building. This is the secret of both the cost reducing function of the chart and its success as "time table."

In the case of our own concern where each job is under the supervision of one of our superintendents, the checking up of manufacturers is done by the Home Office while the superintendents' regular reports indicate the amount of material received at the site at each date of writing and summarize each week the progress in each division of his operation. These reports are then also checked against the job schedule.

This method which has been developed for the insurance of prompt deliveries of materials shortens the time required for the construction of a building, results in a consequent saving in the total cost to the owner and gives him his building for use or for income producing purposes.

Selected Bits From a Builder's Diary

By **DALE R. VAN HORN**

Increasing the Height of a Barn

A CERTAIN farmer had planned for several years to rearrange the interior of the barn and provide it with up-to-date fixtures. As the time drew near, however, for the contemplated change he found that his financial condition did not permit him to take the step.

Not to be outdone, he found, after careful planning, that the present building would do quite well, if the haymow floor could be raised three feet. By measurement it was found that a scant six feet existed between the joists and the floor of the cow stalls. The floor was so low that improper drainage resulted and by the time it had been raised and graded and an approximate eight feet allowed for the height of the space beneath the mow, some three feet would have to be added to the barn.

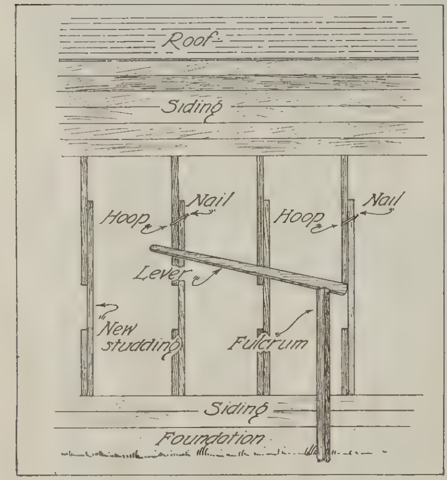


Fig. 1

In spite of the large problem presented, the task of effecting this increase was undertaken, and successfully. The siding was removed from the three sides of the barn from a point two or three boards above the foundation, up to two feet below the eaves. This left the studding exposed. A number of wrought iron hoops were made from quarter-inch iron rod, and bent into a square so that they would fit over the ends of two two by fours together. Then the studding were each sawed off two feet above the sills and one of the rings placed over the cut end of every other stud. Other lengths of two by fours about eight feet long were then prepared and placed inside the ring against the cut uprights as shown. A nail held the ring in place.

By means of the lever shown and a short timber of suitable length, the studding were then each raised an inch or two at a time, the workman going completely around the building. Several braces were put up, one or more on each side, to prevent possible shifting.

Though some time was used in arranging the preliminaries, the building was raised the three feet in less than two hours, and as soon as the desired height had been reached, the new studding were nailed at the top and bottom to the old studding which had been cut.

The corners were made as stiff as before by nailing two two by fours to the four by four post.

The siding was later replaced and the interior arrangement changed to suit.

This method will be found extremely useful in many instances on the farm when small buildings are to be raised or lowered, changed or shifted, and the low cost of the equipment does not prevent it from being used to advantage.

Wood Panels for Screen Doors

IN the fall it is customary to take the screen doors from the hinges and store them through the winter. In their present condition, that is the only logical thing to do. But by providing these doors with light removable wood panels, the screen doors may be quickly made into a good, servicable storm door. If the panels are well made, the screen doors will be particularly braced and will withstand the added usage quite well. And in this condition they form a protecting dead air space between the inner and outer door, which is oftentimes to be desired.

Get some smooth-grained pine flooring which is provided with tongues and grooves and fasten short lengths together slightly larger than the opening to be covered. These strips are held together by narrow strips of the same material, or by one and one-half by one-quarter inch iron straps Holes are provided for wood screws and the various pieces held tightly together.

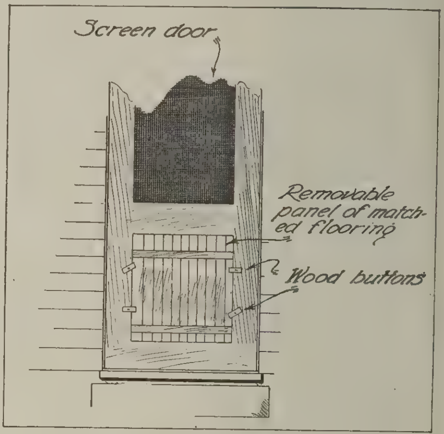


Fig. 2

After the panel has been thus formed, it is carefully squared and fitted into the opening in the door. Another panel is then made for the other opening. Four small wood buttons will be required to hold them.

A typical arrangement is shown in the drawing.

Gothic Roofs

IN spite of a seeming public prejudice against the Gothic or vaulted barn roofs, they are gaining in favor. This is partially due to the attractive appearance and partially due to the simplicity and rigidity of construction. This type of roof does away almost entirely with inside bracing,

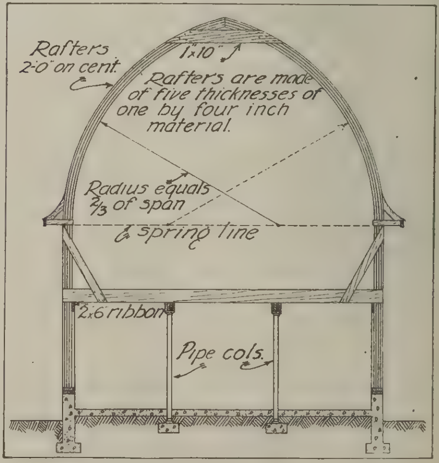

Rafters 2'-0" on cent.
1x10
Rafters are made of five thicknesses of one by four inch material.
Radius equals 2/3 of span
℄ spring line
2x6 ribbon
Pipe cols.

Fig. 3

leaving a maximum amount of space for the storage of hay within.

It is true that a little more lumber is required in the roof construction, but this does not exceed the amount required to a very great extent, when the material for the bracing in the ordinary type of roof is considered. And the fact that one-inch lumber is used, instead of two-inch, shows that the cost, per rafter does not vary much.

The figure shows one such type of Gothic roof. In this style of roof, the rafters or ribs meet at the peak and are held in place by means of a one by ten inch strip each side. The ribs may be cut the length of the ordinary rafters, or extended to the bed piece on the foundation.

In preparing the form for building these ribs, stakes are driven into the ground on a line which is the radius of a circle two-thirds the span of the barn If the barn is thirty feet in width the radius of this curve is twenty feet and is taken ten feet each side of the center on the diameter line.

The one by four inch material should be reasonably free from knots and weak spots, and the joints should not come closer than three feet in any of the five layers. If the services of a conscientious carpenter are secured, this precaution will be carried out religiously. Otherwise ribs which should be strong will be weak.

As the ribs are built up, they are fastened together with the collar beams one by ten inches in dimensions and raised in place. A ribbon consisting of a two by six inch piece is nailed under the point of the joists upon which they set. This ribbon is held in place and supported by an additional one inch strip nailed to the inside of the ribs as shown. Which, by the way, makes about as secure a foundation and side wall as can be obtained. The joists are then nailed to the side of the ribs, resting upon the ribbon.

Another type of the vaulted roof is built by running the ribbons over the ridge in unbroken continuity. The curve of the ribs is the same as in the one mentioned above, but the top portion is reduced to a curve consisting of one-third the span of the barn. Stakes are laid out in the same way and the one by fours laid around this curve, each nailed to the other until the four have been installed into the single unit.

Since at the uppermost portion of the roof, the space is nearly flat, and for this reason unsuited to the laying of shingles, a peak of one-third pitch is secured by nailing short rafters to the top of the ribs, and anchored by a short vertical two inch piece, one end of which is nailed to the top of the rib and the other to the topmost point of the extended rafters. These short rafters are nailed with the lower ends flush with the upper side of the ribs, and form a tangent to the curve.

Green lumber bends much easier than seasoned lumber and can be used to good advantage because it does not have to be seasoned for this type of construction.

The sheathing is then laid in the usual manner and either shingles or prepared roofing applied on the outside surface.

Concrete Collar Adds to Warmth of House

A FARMHOUSE which was originally built with but one room on a cattle feeding ranch was later enlarged to family size. With the added size came the necessity of added warmth. The first portion of the building later served as the kitchen, and was on the north. Due to a sort of haphazard method of construction this particular room was not as well built as the rest of the house and it was found advisable to seek a means of insulating the lower part at least from the cold winds.

As shown in the cut a concrete collar was laid on the outside of the foundation and directly onto the siding of the house. In spite of adverse opinion this concrete wall, which is only three inches in thickness, has stood the temperature changes of four years and in no place has it checked nor shelled off.

The outer surface of the concrete foundation was thoroughly cleaned with water and soaked as well as possible to afford good bonding qualities. All loose paint was removed from the siding up to the height to which the wall was to be laid. Then at six inch intervals horizontally and four inches vertically, ten penny nails were driven into the siding until about two inches of the end was imbedded in the wood.

The forms were laid, care being taken to keep the thickness uniform and provision made whereby a slight moulding could be made at the top to shed water and to not only strengthen the wall, but to add to the appearance as well. The mortar consisted of cement one part, sand four parts and mixed to the point with water where the moisture could be brought to the surface by patting. Woven wire served for the reinforcing for the corners. Prior to the pouring of the mortar, the exposed portion of the concrete foundation was coated with a thin mixture of pure cement and water.

After the wall had thoroughly set and hardened the forms were removed and the outlines of a brick foundation marked on the surface with a spike and straight edge. This idea worked so well on the kitchen that later the whole house was finished in the same way. The photo was taken several years after the concrete was applied.

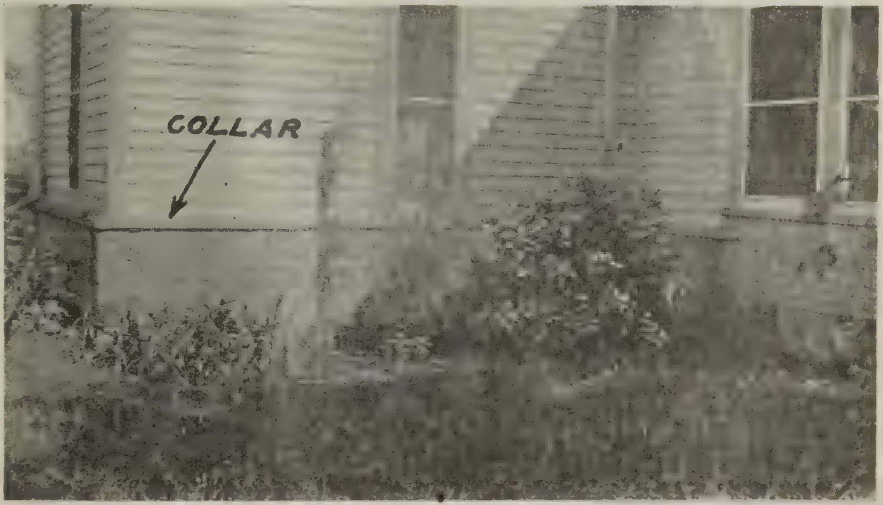
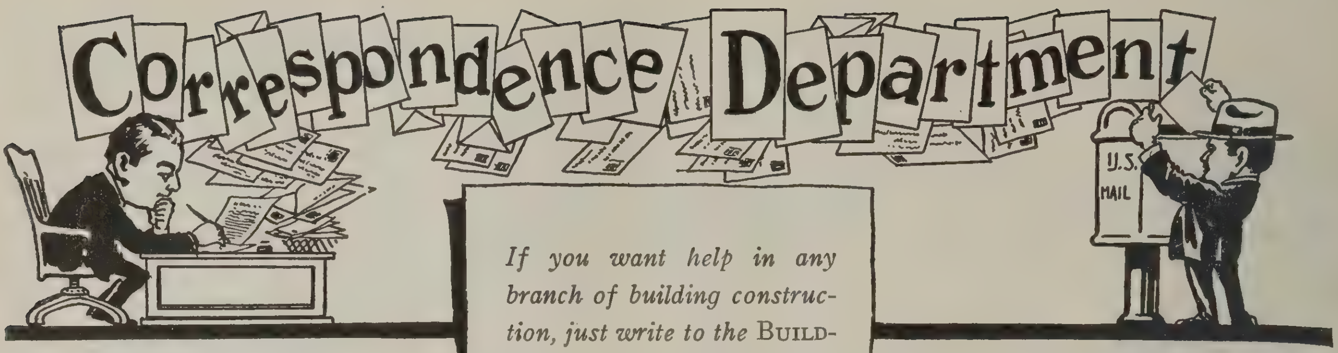


Fig. 4—Showing an actual example of a "concrete collar" that has given warmth to the house



If you want help in any branch of building construction, just write to the BUILDING AGE *Correspondence Department. We will be glad to answer all your questions without charge.*

All readers are invited to discuss the questions and answers published.

Draining the Cellar

Please tell me the best way to drain a cellar so as to be sure that it will be dry the year around. I find that sometimes a tile drain is sufficient and other times it does not seem to do the work. I might say that, when excavating for the cellar, I did not strike water except in spots in the foundation trenches where it stood a few inches. The depth of my cellar floor below grade is about 5 feet 6 inches.—**A. J. C., Salem, Ohio.**

Answer—The case you have outlined indicates that the normal level of the ground water at your property is below the cellar floor and probably a little above the bottom of your trenches. What evidently happens is that, after a hard rain, the water rises in the trenches until it overflows into the cellar floor. This would be particularly so in the rainy season in the Spring of the year.

To avoid this it is necessary to provide some outlet for the water so that it cannot rise in the trench. Where the ground slopes away from the house, this can be accomplished by continuing the trench beyond the building line until it comes to the surface or grade line, giving a slight pitch so that the water cannot "back up." This extended portion of the trench should be filled with broken stone or brick to a depth of about two feet and then covered with straw and loam. If you want, a pipe drain might be laid here instead. The water that collects under the walls will then be drained away, no matter what the level of the ground water outside the house.

If the soil is clayey and crossed by veins of sand, some water may still rise on the cellar floor. This is drained away by broken-stone or tile drains to the main drain mentioned above.

Where the soil is soft and sandy, the outlet drain should have a very slight pitch, not too much, or the rapid flow will swim away the soil under the foundation walls and cause settlement.

Some builders prefer tile drains in order to avoid this scouring action and place them entirely outside the walls of the house. This is more expensive because the excavation must be made larger.

Floors and Walls of Public Comfort Stations

What is the best kind of a floor for a public comfort station? What should the walls be?—**A. R. deK., Jackson, Miss.**

Answer—The floors and walls of any public comfort station should be made of material which does not absorb moisture and which can be easily cleaned. They should *not* be of wood.

The floors should be of concrete, faced with cement, tile, marble or equivalent material. To make a concrete floor non-absorbent, the top dressing of cement must be a rich, dense mixture. It should be finished smooth and kept well painted.

The walls and ceilings should be completely covered with smooth cement, gypsum plaster, glazed brick, tile, galvanized or enameled metal.

In comfort stations that are not too much frequented the walls may be of wood, provided they are kept well covered with two coats of body paint and one of enamel.

HAVE you ever used any machinery or device which has saved you time and money? Have you ever invented any way of doing a piece of work quicker?

If you have BUILDING AGE wants your experience, and will pay regular space rate for it.

Your description should tell just how you saved time and money, either by a special way of using machinery or by short cuts in construction. Point out what methods you were using before adopting your "Time Saver" and show how your new method turns the trick. You can submit as many articles as you want.

Address The Editor, BUILDING AGE, 920 Broadway, New York City.

Laying Tile Floors

What kind of a foundation should I put in for a tile floor? Can tile be laid over ordinary wood floor construction?—**E. L. S., Burlington, Vt.**

Answer—Any brick or tile floor may be laid over wood floor construction, but sufficient strength and, particularly, stiffness must be provided to support the finished floor to prevent it from sagging or settling and to prevent cracking.

If the tile floor is laid over wood construction a 2½-in. concrete foundation should be laid. Leave the top rough to the exact depth below the finished floor line. This depth depends on the tile to be used. For ½-in. thick tile it should be 1 in., to allow for a ½-in. bed of mortar. For heavier tile a 1-in. bed of mortar should be allowed and the depth of the rough foundation below the finished floor line would be equal to the thickness of the tile plus 1 inch.

For cork tile, the foundation may be wood or concrete and the top must be at a depth below the floor line exactly equal to the thickness of the cork.

Making Floors Sound Proof

I have built a number of two-family houses lately and want to ask what to do to deaden the sound of footsteps of the family upstairs. These houses are ordinary frame construction.—**Builder, Chicago, Ill.**

Answer—A similar question was answered in the July issue of BUILDING AGE. In ordinary frame construction the best way to deaden sound is to lay heavy felt paper over the floor joists and nail over this some 2"x3" furring strips on 16" to 24" centers. Lay another layer of felt paper over these strips and, if there is a rough flooring, lay a third sheet of paper between it and the finished floor. Filling material, such as mineral, further tends to absorb vibration and prevent noise, if placed between the joists.

Sizes of Members for a Queens Post Truss

Please let me know how I can construct a strong queens post truss to support a tile roof for a building 58 ft. x 33 ft. 7 in.? I would appreciate your answer to this question through the columns of BUILDING AGE. Please give sizes of the various members. **F. E. D., Memphis, Tenn.**

The roof is to be tiled, and there are to be over-hanging eaves.. The accompanying illustrations have been prepared to meet the requirements, and they will also serve to exhibit the general principle of construction.

Fig. 1 shows a little more than a half-plan, from which it will be seen that five whole trusses are arranged for, also two half-trusses at each end. As the roof is to be tiled, the scantlings of the trusses should be rather stronger than they would be required to be for slates. The following scantlings are suitable in the circumstances stated: Tie-beam, 10 in. by 6 in.; principal rafters, 6 in. by 6 in.; queen-posts, out of 7 in. by 6 in.; straining beam, 8 in. by 6 in.; common rafters, 5 in. by 2 in.; hip rafter, 11 in. by 2 in.; ridge, 7 in. by 1½ in. Figs. 4 and 5 are enlarged details, showing the method of connecting the half trusses and the main trusses. Figs. 7 and 8 are conventional views which will make this part of the construction quite obvious.

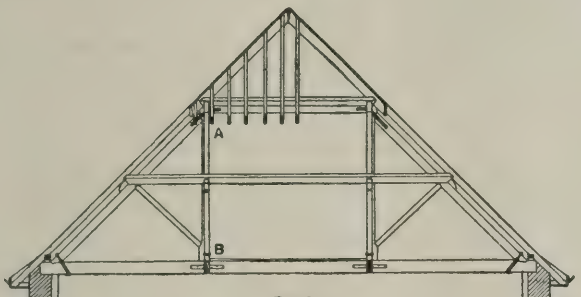


FIG. 2

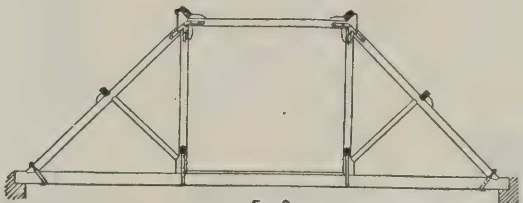


FIG. 3

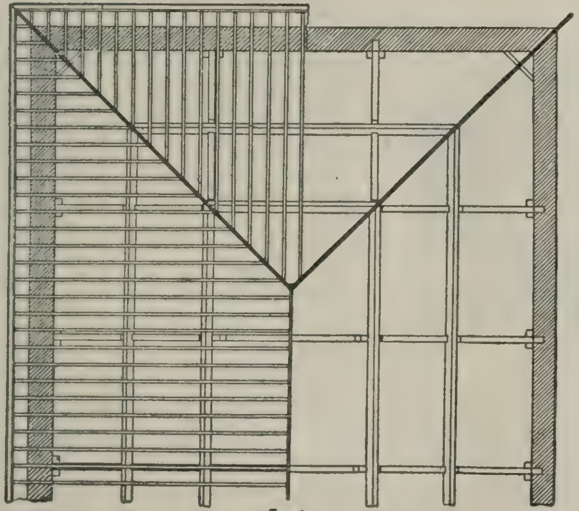


FIG. 1

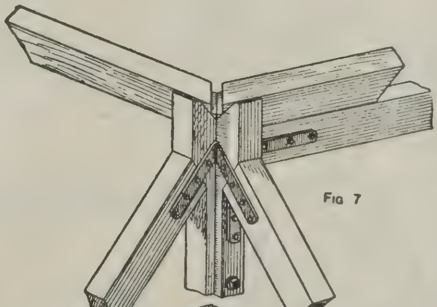


FIG. 7

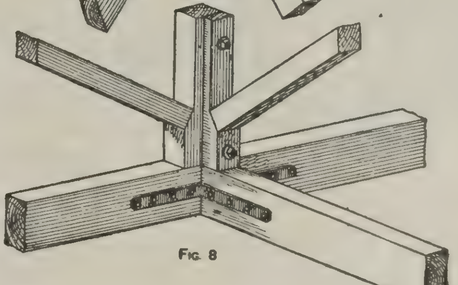


FIG. 8

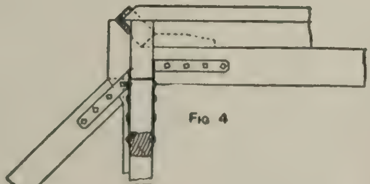


FIG. 4

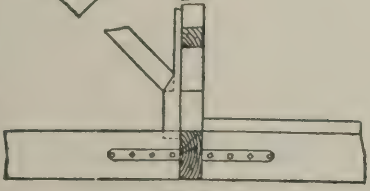


FIG. 5

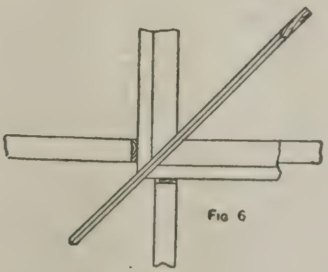


FIG. 6

CONSTRUCTION OF QUEENS POST TRUSS

Fig. 1.—Part Plan of Roof Frame. Fig. 2.—End Elevation of Roof, showing Main Truss and Edge View of Half Trusses, etc. Fig. 3.—Elevation of a Truss. Figs. 4 and 5.—Enlarged Detail of A and B (Fig. 2). Fig. 6.—Plan of Fig. 4, showing Hip, Purlins, etc. Figs. 7 and 8.—Connecting Half Truss to Main Truss, Supporting Purlins, etc.

Economical Heating Plant for Small House

Pipeless Furnace Heating System Easily and Quickly Installed

By **EDWARD BLISS**

WHAT is generally known as the warm-air system of house heating is really a combination of a heating and ventilating system, since the heating is accomplished by circulating warm air through the house. This sort of a system finds a wide use among small houses since it costs but little to install and does its work effectively.

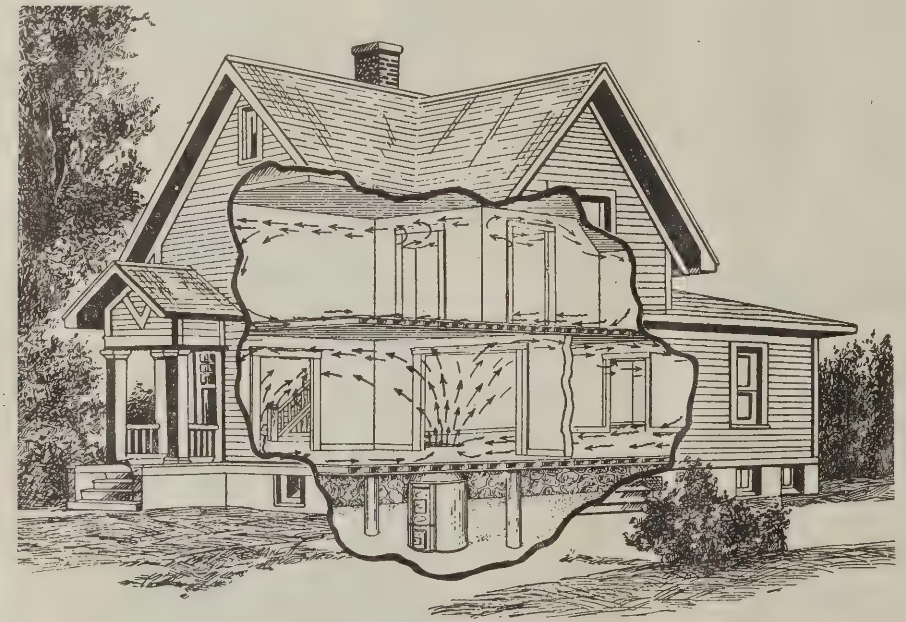


Fig. 1—Showing Path of Warm Air Currents

The pipeless furnace is not an expensive piece of equipment, and is therefore adapted to the very small homes where the cost of auxiliary equipment in the building bears a fairly large proportion to its cost.

The features of this system are as follows:

It heats the house from one register. This register is combination duplex type. By that is meant that it provides for an inlet of cold air separate from the discharge of warm air. It is located as near the center of the house as possible.

The second feature is that it combines a system of heating and ventilating because of the continuous circulation of the air in the house. In the course of this process it keeps the air of a uniform humidity by allowing it to absorb moisture from the water pan.

The third feature is that very little heat is radiated in the cellar, since the warm air passes on the inside of the duplex pipe, which connects the furnace to the register. Any heat that it loses passes to the air in the outer ring of the pipe. This makes it possible to use the cellar for storage of vegetables, fruit, etc., in the winter without fear of spoiling from heat.

The action of the furnace is something like this. The heated air rises through the inner ring of the duplex pipe and is discharged through the center opening of the register into the central room of the house. From there it continues to rise to the ceiling and passes along the ceiling in its endeavor to find openings for escape. In this way it finds its way to the rooms on the upper floors. The cooler air, in the meantime, passes down the outer ring of the register and into the outer ring of the register and the pipe and replaces the warm air that has been discharged.

The rooms on the upper floors of the house are thus heated first and it is only after these have been heated that the rooms on the lower floors are heated by the cooler air returning to the inlet hole of the register. It is not to be concluded from this brief sketch that the air near the ceiling of a room is warm and the air returning along the floor is cold. Such is not the case, although the air at the ceiling naturally must be a few degrees warmer than the air at the floor, in order to produce the necessary circulation. This condition always exists, however, no matter how a house is heated, since the warm air rises.

It must be noted in connection with the pipeless furnace system of heating that all doors of the house must be open in order to heat the entire house, since the heating depends upon the free circulation of warm air throughout the house. Any door that is closed, therefore, will prevent the heating of that particular room.

With a pipeless furnace, as with any warm air furnace, the action of heating takes place immediately. When the fire warms the plates of the fire pot the warm air starts up and a vacuum is formed in the warm-air chamber of the furnace. This vacuum must be replaced by cooler air which is drawn through the outer ring of the register to the floors above. The inner casing of the double pipe is generally made of black iron because it is subjected to a heat of from 500 to 800 degrees F. The outer casing can be of ordinary galvanized iron and never feels more than just warm to the hand. This is due to the fact already explained that the heat given off by the warm air casing is absorbed by the cool air in the outer ring. This action results in the saving of 2 or 3%, and reheats the air before it reaches the hot chamber.

Thus, the process not only forces a volume of warm air directly in the rooms, but at the same time, and by the same process, brings out the cool air, thereby establishing a continuous circulation. The passage of these air currents is gentle and cannot be noticed except directly over the warm-air register. A test with a candle flame, however, would show that there is a continuous flow in each doorway, the warm air entering at the top and the cool air flowing out near the floor. The difference in temperature of the top and the bottom is only a few degrees, just sufficient to cause the flow of air.

This constant circulation of air has a tendency to purify it, since no germ life is likely to pass through the heated air chamber of the furnace, where the temperature is from 500 degrees to 800, as stated above.

The location of the furnace is the most essential point in successful pipeless heating. It must be in a position where the circulation of the heated air is interfered with as little as possible. The opening in the floor must be directly over the furnace. This register opening varies from 30″ x 30″ to 35″ x 35″, according to the size of the furnace. In view of the fact that the furnace has no pipes, etc., with the exception of a short nipple between the furnace and the register directly over it, the pipeless system can be put in cheaply and quickly. It, therefore, lends itself particularly well to installation in houses already built. Where there is no cellar, the furnace is often installed in a pit large enough to hold both it and the coal.

A furnace with a 20-inch fire pot ordinarily will heat from 10,000 to 15,000 cu. ft. of air; a 22-inch fire pot, from 15,000 to 20,000; a 24-inch fire pot, from 20,000 to 25,000, and a 26-inch fire pot from 25,000 to 30,000. The smallest chimney that is likely to give satisfaction should have at least an 8″ x 8″ flue.

The furnace can best be located by the method shown in Fig. 2. After the hole for the register has been marked, if on the floor above, drop a plumb line from the center of the hole, which is found at the intersection of the diagonals. This plumb line locates the center of the furnace on the floor directly below.

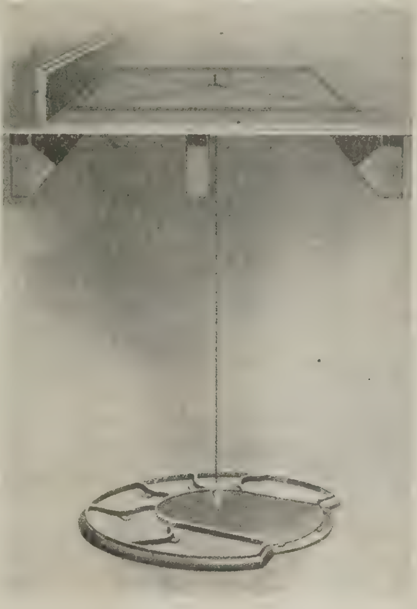


Fig. 2—Locating Position of Furnace in Cellar

Talk Building to Them Early

By FRANK H. MADISON

HE'S likely to build some day so I guess I'll start to impressing him that I am a good builder."

Did you ever sit down with the local paper and search it carefully for the names of *eventual* prospects for your business? Of course you have seen an item that Mr. So-and-so planned to erect a residence to cost $9,000 and you have gone after that —but so have your competitors. But as for seeing a long way ahead and interesting a man in your work before he even decides he is going to build, have you ever done that?

Suppose you see an item like this:

"Charles Beckwith has sold his 160-acre farm three miles west of town to Martin Johnson for $175 an acre. Mr. Beckwith has not decided his future plans, but may retire."

What are Mr. and Mrs. Beckwith talking about these days? The chances they are looking around and debating shall they move to town or not. And shall they buy or *build?* Probably they are getting fairly old and Mrs. Beckwith thinks that it's about time she got the house with the rooms, and the porches, and the closets the way she's always wanted them. Suppose that at the time they are discussing the coming adventure —for they have been on the farm so long moving is an adventure for them—the rural mail man brings an envelope (with a two-cent stamp on it) and they find your timely ad.

Maybe Mr. and Mrs. Beckwith will not consult you, but they are not likely to forget the impression of alertness made by the timely arrival of your little bit of advertising matter and at any rate you will stand a better chance at the contract when it is let than if they had never heard of you. Suppose that one out of every five persons who get your circular spreads the idea that you are a business-like builder—will the increased prestige in the community be worth the cost of the advertising.

This circular can be mailed to others whose names you will find in the local weekly. You cannot expect each one to bring immediate business, but if you are building a permanent business, you are forcing the people who will *eventually* build to realize that you are enterprising. Therefore you can afford to send your advertising to newly married couples—most of them plan to have their own homes.

When You're Thinking About a New Home

and wondering if it's best to buy or build many questions come up that an experienced builder could answer.

Probably you've had a certain kind of house in mind for a long time—rooms laid out just so, and you know just how many closets you want.

Even if you're not certain about getting the house there may be things you'd like a good contractor to tell you.

I'll be glad to help you all I can and you will be under no obligation whatsoever.

H. J. PHELPS
Contractor and Builder
123 W. Main St. Jamesville

Other good prospects from the local paper are: new merchants and professional men who have just come to town; heirs to large estates as shown by the court columns, and people who have been awarded large sums as damages in courts. Other items will suggest themselves after you get into the habit of studying the columns closely and applying to each local paragraph the test:

"Is he likely to build some day?"

What the Housewife Likes in Her House

Little Features That Make Houses Sell Quicker

BUILDERS and architects are considering the comfort and convenience of the housewife in the layout and building of their houses today, in a way that they never have before. They realize that if their buildings make a comfortable and convenient home for the woman, nine times out of ten the prospective purchaser will buy it. It is for this reason that we have today such things as breakfast nooks, built-in ironing boards, refrigerators that can be iced from the outside, adequate closets and cabinets, and many other features that are very useful today.

The builder, therefore, who makes his house attractive and desirable to the feminine element has enlisted a powerful ally on his side, as every man knows. It takes something more than mere rooms and doors to make a livable workshop for the housewife. In these servantless days it is necessary to save footsteps and useless effort in every direction.

For example, as the woman dries her dishes she naturally likes to reach one up into the cupboard direct, instead of having an ungainly pile to lift when they are all done. This necessitates keeping the door of the cupboard open while operations are in progress. An ordinary door is often possessed of just that perversity that it will contrive to swing to exactly the angle that causes the woman to bump her head on it.

The solution for this difficulty, as for many others, is the sliding door. Inasmuch as the door to a cupboard need not be heavy, just a narrow pocket will serve the desired purpose.

Built-in cupboards may have a hinged drop table. This will be out of the way when not in use, thus economizing floor space, and yet serving every purpose of a real table when wanted, with the added convenience of proximity to the cupboard.

If the bottom step in the main hall is hinged, forming a little box, it is a convenient receptacle for overshoes.

Just as the modern refrigerator is located with its back to the outside kitchen wall, permitting it to be filled from the outside, so, too, there may be a closet of as large size as desired, similarly placed, with a door cut on the outside to permit the grocer, milkman and other trades people to place their supplies without disturbing the housekeeper by ringing the bell. Package receivers may be bought that satisfy the requirements very adequately. They admit the delivery of goods while the delivery man stays outside. He may open the outside door and insert his wares, but after it is closed it latches and cannot be opened again until the latch is released from within. Some of these package receivers are made with more than one compartment, and they save endless annoyance and inconvenience.

The handling of garbage is perhaps the pet abomination of the housewife, and many methods have been devised to make it less disagreeable. Successful burning on the premises where it originates is the modern method of garbage disposal. What is known as the Kernerator abolishes all garbage and waste cans, eliminating the trash pile with its disease-spreading dangers, and saving the always unpleasant handling of refuse. It receives waste of every kind, including tin cans and bottles. Once installed there is no further cost. The waste is simply fired and goes up the chimney in smoke. The process is odorless, sanitary and economical. There is eliminated the breeding place for vermin, the fire-hazardous waste accumulations in dark corners.

Much fun has been poked at buildings with a "Queen Anne" front and a "Mary Ann" back. It is bad enough to have inequalities like this, to be sure, but it is worse to emphasize them by the indifference that marks many kitchen porches and backyards. One's sense of pride would seem to dictate more than usual care to counterbalance the effect of the "Mary Ann." The back porch proclaims its little story to the neighborhood if it is littered with all sorts of discarded rubbish, if it has that down in the heel, out at elbow look. So also does it proclaim a story if it is kept in repair, freshly painted, and without the superflous unwanted things that too frequently adorn it. A box seat built into the kitchen porch, into which unsightly articles may be placed, will add to the orderliness of the back door outlook. It may be as long as desired, and may be built to simulate pleasing rustic or other effects, to add decorative interest. There is usually no good reason why a suburban house cannot have an attractive kitchen porch. There should be a comfortable chair where the housewife might peel potatoes or prepare other vegetables. Why not some structural flower boxes on the back porch, and some lattice in the back yard to shut out some of the promiscuous activities like clothes drying.

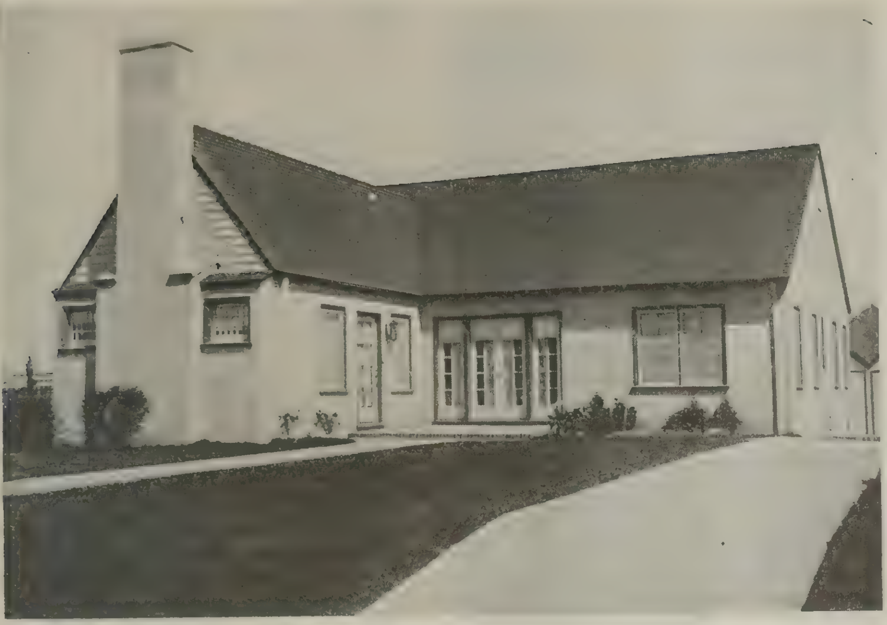
These things make all the difference between a contented housewife and a discontented one. The drudgery of housework can be immensely lightened by a consideration for the attractiveness of the surroundings.

Freight Rates and Lumber Costs

THE New York State College of Forestry, referring to a statement made by Colonel William B. Greeley, chief forester of the United States, that it now costs Chicago $22,500,000 more a year for freight on lumber than it did thirty years ago, inquires thirty years hence what will freight on lumber cost Chicago? If it costs the windy city such an enormous sum a thousand miles nearer the supply, what will it cost New York in another generation?

The country's annual freight bill on lumber is now $200,000,000 and when the southern timber supply is exhausted as it will be at the present rate of consumption in eight or ten years, the entire nation will have to obtain lumber from the Pacific Coast states, Oregon, Washington and California. It is estimated that the annual freight bill for the nation will have increased about 400 per cent. at that time; in other words, the people of this country will be paying $800,000,000 for freight on lumber.

The eastern states being the most remote from the western supply will pay the major portion of this big freight bill. It is estimated that the eastern central states will increase their annual consumption of western timber 11½ billion board feet in the next decade. At present freight on Douglas fir costs about $20 per thousand board feet to transport from the coast to New York.



Well Handled Exterior Has Given Pleasing Effect to This Stucco Bungalow
Andrew E. Norman, Architect

A Cozy Stucco Home

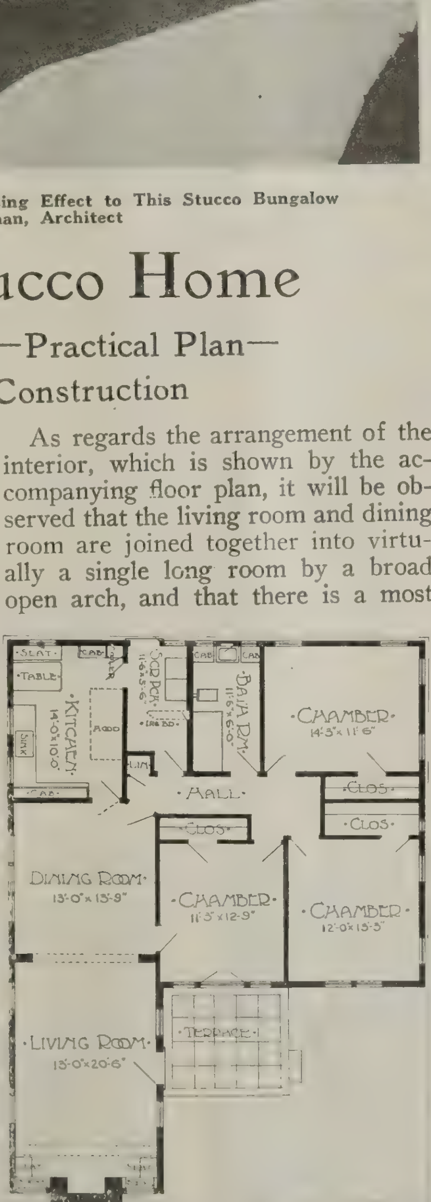
Charming Exterior—Practical Plan—Inexpensive Construction

THE little stucco bungalow shown above, presenting a very attractive outside appearance and possessing a compactly and conveniently planned interior, constitutes a most charming and practical inexpensive home. Formed somewhat like the letter L, it is designed with an open, cement-paved terrace in the recessed corner, which has its exposure toward the street; and the main front entrance leads from one side of this terrace directly into the living-room, while from the rear of it there is a pair of French doors, with a French window at either side, opening into one of the bed rooms. The door comprising the main entrance is likewise of glass. A large outside chimney, of brick construction but surfaced with stucco, is a prominent and enhancing feature of the front gable.

Exterior Features

The house's exterior walls are of cement-stucco over frame construction, and are finished in a deep, rich cream shade. The front gable, however, is shingled, but painted to match the stucco. The shingled roof is black, and the trimming is done in dark green and white, while the cement paving of the terrace is edged with dark red brick.

As regards the arrangement of the interior, which is shown by the accompanying floor plan, it will be observed that the living room and dining room are joined together into virtually a single long room by a broad open arch, and that there is a most economically planned hall leading off a corner of the latter division which provides direct connections with each of the three bed rooms, the bath room and the rear-entry porch. Also deserving of particular notice are excellent closets for the bed rooms and many delightful built-in features. The latter include a bookcase and a box seat at each side of the living-room fireplace, a pair of shelf and drawer cabinets and a medicine-case in the bath room, a linen closet in the hall, a cabinet ironing-board on the rear porch, and a stationary seat and table for breakfasting, a draught cooler-closet, a lot of cupboard space and the other usual conveniences in the kitchen.



Floor Plan

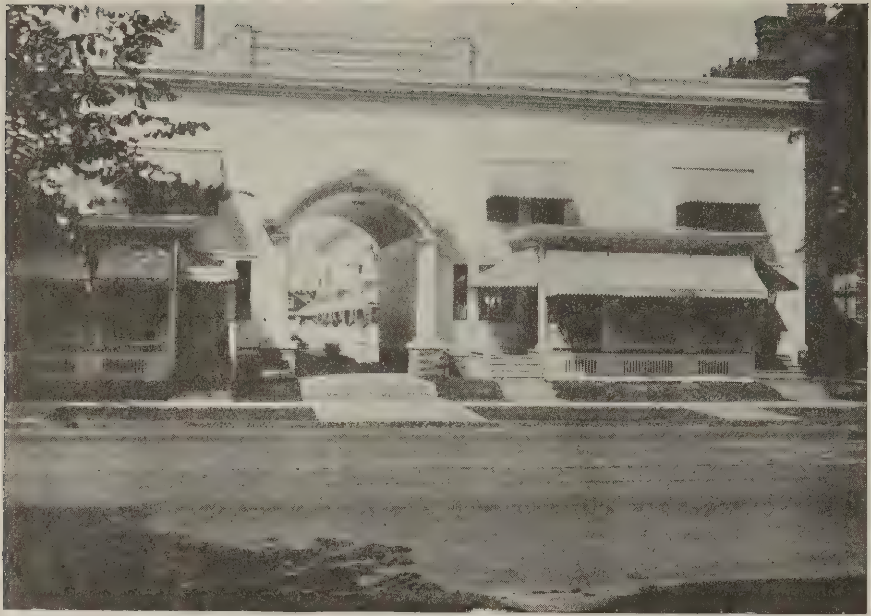
Interior Woodwork

The interior woodwork consists of pine throughout. In the living room, dining room, bed rooms and hall it is finished in old ivory, and in the bath room and kitchen it is in white enamel. All walls are plastered and papered, except that in the bath room and kitchen they are plastered and finished in wainscot effect with a smooth, hard plaster coat which is enameled like the woodwork. Tile flooring is used in the bath room, pine in the kitchen and rear porch, and oak throughout the remainder of the interior. The fireplace in the living room is finished with a wood mantel of Colonial design and has a brick hearth extending across the entire width of the room.

The bungalow is located in Los Angeles, California, and was designed by Walter S. Davis, of that city. It possesses neither basement nor cellar, but is equipped with built-in gas radiators for heating and all other modern conveniences.

The Boston Strike

THE strike in the Boston building trades began last January with the demand of the plasterers for an advance in wages from $1 to $1.50 an hour. The demands of this and other unions never were granted. After about six months of fruitless negotiations the leaders of the unions quietly advised their members to take what jobs they could find and make the best of terms they could. The builders had resumed operations in some degree on the open shop plan, and during the last ten weeks or more have taken on men in all the building trades without reference to their union membership and often in ignorance of their status in this respect. In State street plasterers have been at work at 90 cents an hour and their helpers at 65 cents an hour, a reduction of about 20 per cent.



A BEAUTIFUL TWO-STORY APARTMENT HOUSE ON GENESEE STREET, UTICA, N. Y.
The name over the arch reads: "Genesee Court." On each side of the arch are two apartments. Two wings extend back, each having eight two-story apartments, making twenty apartments in all.

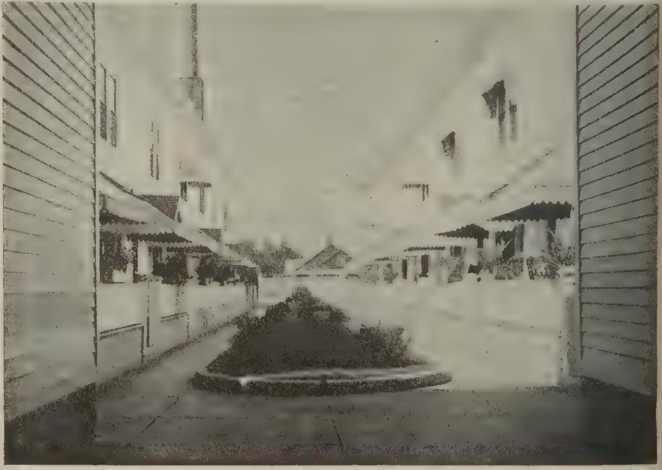
Not Mere Tenements But Homes

ONE of the most unusual tenement houses in Utica, N. Y., consists of two parallel wings extending back from the part that fronts on the street. In the center is an archway that opens into a central court, which the owner has named Genesee Court.

The whole structure is two story. Said a woman living in one of the tenements, speaking to the representative of BUILDING AGE, who was taking a picture of the court, "These are not flats but tenements. Each one has six rooms—a hall and three rooms below, and a bath room and three rooms above, and they are delightful tenements in which to live."

There are eight of these two-story tenements on each side of the court. In the court is a cement walk, and in the center is a strip of lawn, midway in which is a fountain. The whole is well kept. Each tenement has a door on each side of the wing, one opening on the court and one on the opposite side. The Spanish *patio* is unusual in apartment house design.

Showing the extension of the left wing and the back doors and windows of the eight apartments.



A close-up of the court. The lawn extends nearly the length of the court. A fountain in the center is playing.

Not All Who Build Are Builders

ONST there wuz a Man who went into the lumber bizness for himself. He wuz stiddy an' Ambitious. He had a Pleasin' personality an' he soon maid Friends.

Inside of a year he wuz doin' a nice bizness, an' at the end of five years he had a home of his Own, wuz out of debt, an' wuz pilin' up a Tidy bank account.

About this Time he had a chanct to go into the bilding bizness, an' he Hustled around, took awl his own spare Kash, mortgaged his home, an' borrerred sum more sew that he could start bilding.

He overlooked the fact that he wuz in a specialized Line of lumber bizness, an' new nothin' about bilding. But peppul Kongratulated him on bein' sew prosperous, an' he felt that he wuz a big, big Man.

He carried on his ole bizness with the ade of clerks an' Spent much time on the job. Won day he took a kontract for a big, big bank. He Ordered several carloads of stuff an' raised money to help Swing the deal. When the stuff come he had it to pay for as per Kontract.

In the meantime prices had took a tumble and wuz worth Far less than the price Paid. His loss wuz enough to Swallow his lumber bizness, his Home, an' awl his Assets.

His wife sez that they can start anywhere now, for they have nothin' to Encumber them except four children.

Our Friend sez that he maid a Mistake not to let well enough alone, an' to stick to the kind of bizness what he new awl about!

New Catalogs and Publications

727. **Hot-Water Heater.** The Elliott Cook-Top Water Heater for gas or oil stoves makes it possible to cook meals and heat water at the same time and with the same flame. Catalog and instructions furnished by Vola Trading Corp., 42 Broadway, New York.

728. **Nokol Automatic Oil Heating** is described in an instructive and convincing manner in the booklet of the Steam Corporation, 215 North Michigan Ave., Chicago, giving certain advantages of the use of oil as fuel.

729. **Homes of Moderate Size** is a new book, 143 pages, 9 x 12 in., just published and now for sale by the U. P. Co. Book Co., 243 W. 39th St., New York City. It consists of a collection of photographs and plans of modern suburban and country houses of Colonial, Italian and English architecture, from the work of Kenneth Dalzell. Charge is made by the publishers.

730. **Plumbing Goods.** The Standard Sanitary Mfg. Co., Pittsburgh, Pa., has issued a 650-page bound book on its products, each page illustrated, and describing the various types of equipment manufactured by this organization.

731. **Sewage Disposal.** The Aten Sewage Disposal Co., New York, has a 24-page pamphlet in circulation covering principles of sewage disposal and proper methods to employ. Illustrated.

732. **Richards Wilcox Doorways.** The monthly booklet with its usual short editorials and comment has been received. Covers fire doors, garage doors and casement windows. Richards Wilcox Mfg. Co., Aurora, Ill.

733. **Kolesch & Co.,** New York City. A new price list is available, covering architects' and builders' stationery and supplies in wide variety. The possession of many of these things will largely increase the efficiency of users.

734. **Vulcanite Roofing.** Samples of Vulcanite Roofing Shingles, together with literature, may be had from the Beaver Board Co., Buffalo, N. Y.

735. **Reinforced concrete poles,** is Bulletin 25 as issued by the Assn. of American Portland Cement Mfrs., Philadelphia. The increasing demands of telephone, telegraph, light and power companies and the increased scarcity of good timber, makes necessary a substitute, hence this book.

736. **National Plastic Relief Co.,** Cincinnati, Ohio, issues 75-page booklet filled with suggestive illustrations for architraves, balcony fronts, capitals, cornices, moldings, grilles, panels and other details where this sort of decoration is desirable. Orders are filled for new designs, and prices on the standard designs are given.

THESE catalogs may be secured direct from the manufacturer. If you prefer, write the date of this issue and the numbers of any catalogs on a postal and mail it to "Building Age," 912-920 Broadway, New York City. The catalogs will be sent you without charge, unless otherwise noted.

737. **Concrete Work.** Vol. 2 of this work is now released by its publishers, John Wiley & Sons, New York City, and forms a fitting supplement to the work undertaken by Vol. 1. A series of 132 job sheets are included. This book is sold by the publishers.

738. **Copper in sheets,** plates or rolls is described in the booklet of C. G. Hussey & Co., Pittsburgh. Book No. 3 takes up flat seam sheet copper roofing and flashings. Practical information with constructive features is given. This is useful for any builder.

739. **Thermostats.** Information on temperature regulating systems may be had from the booklet of the Gold Car Heating & Lighting Co., Brooklyn, N. Y. For the automatic control of steam, hot water or hot air heating in dwellings, offices and public buildings.

740. **Bermico.** Brown Co., manufacturer of kyanized lumber, pulp, paper and chemicals, Portland, Me., will supply catalogues or sample books to those interested.

741. **Solar Metal Products Co.,** Columbus, Ohio. An architects' handbook may be had on request and will be found valuable in laying out, detailing and designing any hollow steel installation.

742. **Casement Windows.** Crittall Casement Window Co., Detroit, Mich., will send catalogue showing details and various arrangements of Crittall sash to architects and engineers. Full-sized details of Crittall casements as set in many different types of construction will be sent if requested.

743. **Ventilating Window and Porch Shades.** The Aeroshade Co., Waukesha, Wis., will send the Aerolux catalogue where desired, which is of considerable interest as a scientific system of windowshading.

744. **Magnesias Assn. of America,** c/o Keasbey & Mattison, Ambler, Pa., will give a practical handbook, "Let 85% Magnesia Defend your Steam," dealing fully with the manufacture, uses and application of this material, and the theory and practice of heat insulation.

745. **Valves.** A catalogue of all the Jenkins Bros. products, New York, giving sizes, styles and prices, will be mailed on request.

746. **Murphy Varnish Co.,** Newark, N. J., issues a series of educational books on architectural varnishes and enamels, floors and their care, rare woods, etc.

747. **Speaking of Floors.** The large and well illustrated booklet of the Armstrong Cork Co., Linoleum Dept., Lancaster, Pa., will be of considerable interest to builders, decorators and home owners. Every room in the house is discussed.

748. **Kodak on the Job.** Eastman Kodak Co., Rochester, N. Y., give information on the proper way of keeping tabs of the progress of building by means of photography.

749. **The Story of Kellastone** may be learned from literature of the National Kellastone Co., Chicago, which treats of converting old buildings into new ones by the use of this material.

750. **Hollow Tile houses** together with floor plans are shown in colors in the descriptive matter of the Hollow Tile Building Assn., Chicago.

751. **Mar-Sla Mfg. Co.,** Youngstown, Ohio, have a new building material claimed to have strength, beauty and to give economy of result. Builders will find this interesting.

752. **Roofing Facts and Figures** is the name of the booklet distributed by Wm. L. Barrell Co., New York, on the subject of Concertex.

753. **Stuko Steel Co.,** Youngstown, Ohio, is circulating information on a new building material with considerable possibilities for builders.

754. **Illinois Zinc for Roofing** is described in circular matter of the Illinois Zinc Co. of New York. This is informative and worth having.

755. **Wood Finishing** from the builder's and decorator's point of view, is illustrated in color in the booklet of S. C. Johnson & Son, Racine, Wis.

756. **Floor Surfacing.** American Floor Surfacing Machine Co., Toledo, Ohio, issues catalogue on the many economies effected by the use of the American Universal.

757. **Heating Information** may be had from the literature of the Co-operative Foundry Co., Rochester, N. Y., in a series of illustrated booklets.

758. **Kerner Incinerator** is a private garbage disposal plant claimed to perform its function economically, hygienically and conveniently. Books and folders on request, Kerner Incinerator Co., Milwaukee, Wis.

759. **ILG Electric Ventilating Co.,** Chicago, will give installation details

and good selling information on the kitchen ventilator which prevents odors from circulating through the house.

760. **ElectriCoal** describes the Magee range for double service, electricity and coal. Makes possible the use of both fuels either at once or independently. Interesting illustrated literature is distributed by the Magee Furnace Co., Boston, Mass.

761. **Hill's Clothes Dryers** are among the devices that help to keep wash-day appliances neat when in use and out of the way when not required. Readily attachable to roof, balcony or lawn. Compact and strong. Sizes, types, etc., described in pamphlet of the Hill Dryer Co., Worcester, Mass.

762. **Diamond Metal Weatherstrip Co.,** Columbus, Ohio, has interesting literature available for distribution.

763. **Vitrolite Co.,** Chicago, Ill., has a material for kitchens, bathrooms, table surfaces, etc., requiring no paint or paper and is inexpensive. Descriptive circulars.

764. **Ambler Asbestos Shingles** are fully described and illustrated in the literature of the Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.

765. **American Floor Surfacing Machine Co.,** Toledo, Ohio, states opportunities for users of their machines. Full and important information on request.

766. **American Wire Fabrics Co.,** Chicago, will send samples and descriptive literature with reference to screen wire cloth that fills every requirement of this material.

767. **National Fireproofing Co.,** Pittsburgh, Pa., has valuable information and co-operative helps for builders.

768. **Building with Assurance** is the title of an unusual and valuable book issued by the Morgan Sash & Door Co., Chicago, manufacturers of woodwork trim in all its forms. A free prospectus may be obtained that will prove of undoubted interest.

769. **Embossed Metal Ceilings** and Side Walls, sanitary, durable, germproof, fire-resisting, are described in large catalogue of Edwards Mfg. Co., Cincinnati, Ohio, together with information on metal roofing, metal shingles, metal Spanish tile, metal garages, portable buildings, etc.

770. **Inswinging casement hardware** as made by the L. P. T. Specialty Co., Chicago, is worthy of investigation. Locks and automatically seals in one operation. Easy to install and moderately priced, according to detail information available.

771. **Oak Floors.** Three booklets may be had from the Oak Flooring Mfgrs. Assn., Chicago, explaining how to sell more oak flooring and why.

Book Notes

Handbook of Standard Details. By Charles H. Hughes. D. Appleton & Co., New York, publishers. For engineers, draftsmen and students. Flexible binding, 7 x 4½ in., 312 pages, illustrated

This book has been compiled to present to engineers and draftsmen in convenient form the drawings, tables and formulæ of standard details for use in designing. There are eight sections, each sub-divided to include the topics falling naturally within its scope. The sections include Drawings, Fastenings, Power Transmission, Pipe, Tubes and Fittings, Rope and Chain Fittings, Miscellaneous Details, Structural Details and Useful Tables. The book is very comprehensive and contains a detailed index of considerable value. Illustrations in the form of diagrams abound on every page.

Concrete Work. By Wm. Kendrick Hatt, C. E., Ph.D., and Walter C. Voss, B.S. John Wiley & Sons, Inc., publishers, New York. Cloth binding, 7½ x 5 inches, 206 pages, illustrated.

"Concrete Work" is Vol. 2 of a series designed to aid the self-development of workers in concrete and for students in engineering. An urgent need exists for the training of inspectors and workers who shall have an understanding of the laws controlling the handling of concrete. This the present volume seeks to satisfy. Most of the applications of concrete, states the preface, are founded on a few fundamental principles and operations, of computing, selection of materials, mixing and placing concrete. These principles are best understood by actual practice, and the book has therefore made a feature of 132 job sheets to elicit effort on the part of the practical reader. It is in effect a book of experiments for the would-be worker in concrete. Vol. I. contains the basic information necessary. The problems cover the topic with considerable thoroughness and are illustrated with diagrams and sections.

Elements of Specification Writing. By Richard Shelton Kirby, C. E. John Wiley & Sons, Inc., New York, publishers. 9 x 6 inches, cloth binding, 150 pages.

As a text book for students in civil engineering, this work, whose author is assistant professor in the Sheffield Scientific School of Yale University, is representative. It covers all those perplexing intricacies of specification writing that beset engineers even after they have spent years in the field. A dozen chapters discuss those necessary relationships between contractors, engineers and those with whom they are constantly thrown in contact. The responsibilities and rights of contractors and engineers are set forth as is also a very clear analysis of all the purposes and functions of contracts and specifications. Practical examples are given, together with a useful index.

Judge Landis Gives Chicago Building Trades 12½% Cut

(Continued from page 54)

tractor; that the original contractor must finish the job or any part thereof for which he may have a contract; that no plasterer will work on such a job for anyone except the original contractor, etc., etc.

Should these parties eliminate these vicious provisions and make a clean agreement in line with the uniform suggestions and principles announced, a fair wage would be $1.10 per hour.

The sheet metal trade is not in the arbitration. An agreement appears to have been tendered the union by the contractors based on the uniform agreement and refused by the union, which in turn appears to have tendered an agreement to the contractors. This latter document does not adopt the uniform agreement and is in conflict with it. The "work covered" is written as a definition of jurisdiction and, therefore, is pregnant with controversy. Double pay is required for over-time; shop rules and regulations are included. These have no place in agreements covering building trades. Should this agreement be re-written in harmony with the uniform agreement, uniform suggestions and principles a fair wage rate would be 95 cents per hour.

The painters are not in this arbitration. This trade is now operating under an agreement running until April 1, 1922, providing for wages throughout the remaining period at $1.25 an hour. One section provides for a sympathetic strike; another authorizes the union to call a strike on any shop for any reason that may appear just to the union. It is further provided "that all sash, frames and screens must be primed, painted and glazed on the job." The contractor is expressly forbidden to handle tools, scaffolding or material with the exception that this restriction does not apply to contractors who are members of the union. The union is authorized to cancel the agreement at any time for any alleged violation. Overtime is paid for at double the regular rate, or $2.50 per hour.

Should these vices be eliminated and an agreement covering this trade be prepared in accordance with the uniform agreement, uniform suggestions and principles, a fair wage rate would be 95 cents per hour.

The glaziers and fixture hangers were in the arbitration but because of certain impossible conditions insisted upon by both employers and employes apparently with the sole purpose of effecting a monopoly and necessarily occasioning waste the umpire refused to fixe a wage. Should these agreements be re-written in accordance with the uniform agreement, uniform suggestions and principles and not in violation of law, a fair award would be to the glaziers 95 cents and to the fixture hangers, $1 per hour.

.54
3
Arch.

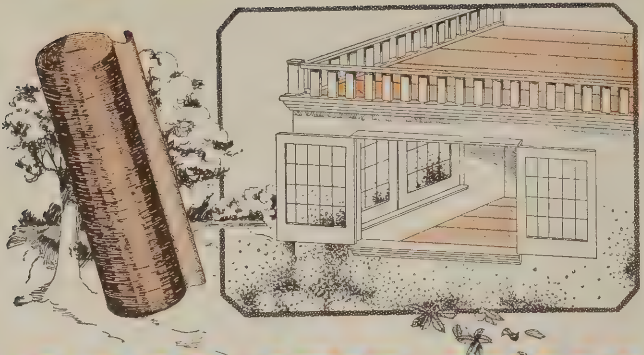
NOVEMBER 1921

Building Age

VERSITY OF ILLINOIS LIBRARY
NOV 11 1921

43RD Year

25 Cents



CON-SER-TEX

CANVAS ROOFING

THE IDEAL ROOFING

FOR Porch Floors, Sun Parlors, Sleeping Balconies, and all flat surfaces,

Wherever a durable flashing or a lining for a wood box gutter is required—

Wherever an economical, durable, attractive covering is needed—

Con-ser-tex Canvas Roofing will give satisfaction. It's a chemically treated heavy cotton fabric which will not crack, stretch, shrink, curl or peel. It's easy to lay and profitable.

Our Free Booklet, "Roofing Facts and Figures," illustrates and explains the many uses and advantages of Con-ser-tex.

WILLIAM L. BARRELL CO. of N. Y., Inc.

50 Leonard Street New York

Chicago Distributors:
Geo. B. Carpenter & Co.
430-440 North Wells St.

California Distributors:
Waterhouse-Wilcox
San Francisco & Los An

FLOORS

The Wood-Mosaic Kind

For every home—Old or New. Can be installed by your mechanics. Our 5/16" flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood Carpet, strips Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalogue in natural wood colors.

Wood-Mosaic Company
New Albany, Indiana

M&F Co. TRADE MARK Fiberlic

Fiberlic Wall Board

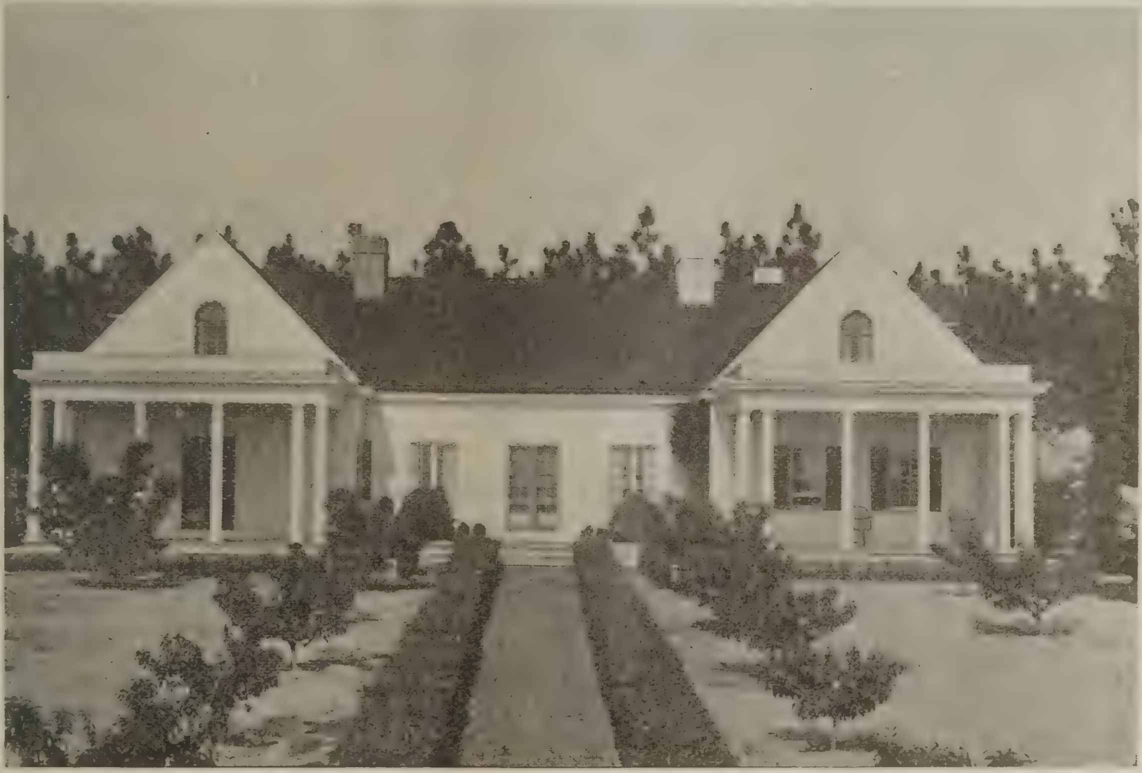
The *material* from which it is made, the fact that the pulp is *chemically cleansed* and that the *fibre lengths* give the finished product that *natural reinforcement* that is lacking in ground wood boards, is in itself a guarantee of the superiority of Fiberlic for *strong, permanent, economical* and *sanitary construction.*

MacAndrews & Forbes Company
200 Fifth Avenue, New York City
Factory: Camden, N. J.

BUILDING AGE

NEW YORK, NOVEMBER, 1921

An Unusual Bungalow of Colonial Design



RESIDENCE OF JOHN R. PUSHEE, SOUTHERN PINES, N. C. **AYMAR EMBURY II, ARCHITECT**

THE bungalow home shown here is that of Mr. John R. Pushee, located amongst the pine trees at Southern Pines, N. C. It is the sort of a country home that will appeal to a family of taste; it is, however, rather larger than the average good country bungalow. There are many unusual features of its design that merit a careful study of its details by building contractors as well as intending home owners.

There have been many bungalows of so-called Colonial design, but in the Pushee house the architect, Mr. Aymar Embury II of New York, has carefully worked out a design that is correct in detail and proportion and applied it to a bungalow. The resulting building is a homelike country house that shows what can be accomplished by a close co-operation between owner, architect and builder. Much credit is due to Mr. J. J. Stroud of Southern Pines, N. C., who was the building contractor.

The outside of this home is covered with wide bevel siding with corner boards and ornamental wood cornice; the living room front is made of a number of wood pilasters with moulded panels between and the cornice is carried along on the same lines and corresponds with that of the covered piazzas, the roofs of which are supported by round columns. These

Close View of the Front Porches

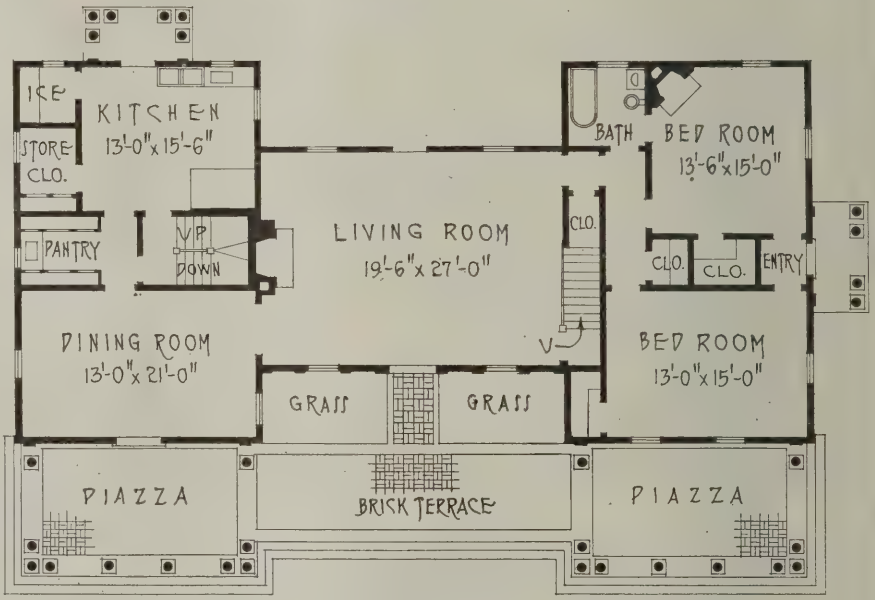
details are shown very clearly in the two smaller pictures.

One may wonder that two chimneys are shown as coming from the middle or living room section of the house while only one is shown on the plan—the chimney on the right-hand side is a piece of false construction stuccoed and flashed to look like the other real chimney. This is a little nicety of the design and shows how the architect secured a perfect balance to his exterior design.

The two floor plans show the arrangement of the rooms, the design is in the form of a letter H. A brick terrace extends along the entire front, and each wing has its covered piazza.

One enters the large living room from this terrace and a smaller rear entrance has also been provided. An open fireplace is at one side and the stairway to the two guest bedrooms are on the other side. Windows open both to the front and rear of this room, and while this is a fairly large room, it is so well proportioned that the furnishings "fit" and give a decided homelike appearance without crowding.

To left of the living room is the dining room and kitchen with two bedrooms above. French doors lead from the living room to the dining room and from the dining room to the piazza. Separating the dining room and kitchen is a pantry with double swing doors, and from this pantry as well as from the kitchen one reaches the stairs leading to the upper bedrooms and the cellar. Off the kitchen is a separate storeroom, also a closet for the refrigerator. As will be noted the kitchen itself is well arranged, a window is placed directly over the sink.



First Floor Plan

The bedrooms are of good size, with ample closet room, and each unit of two bedrooms has its own bathroom; the first or ground-floor bedrooms have a separate outside entrance.

In connection with the description of this artistic home we cannot help but quote the following remarks from Mr. Embury's article prepared for the American Face Brick Association. They relate to the co-operation that should exist between owner, architect and builder.

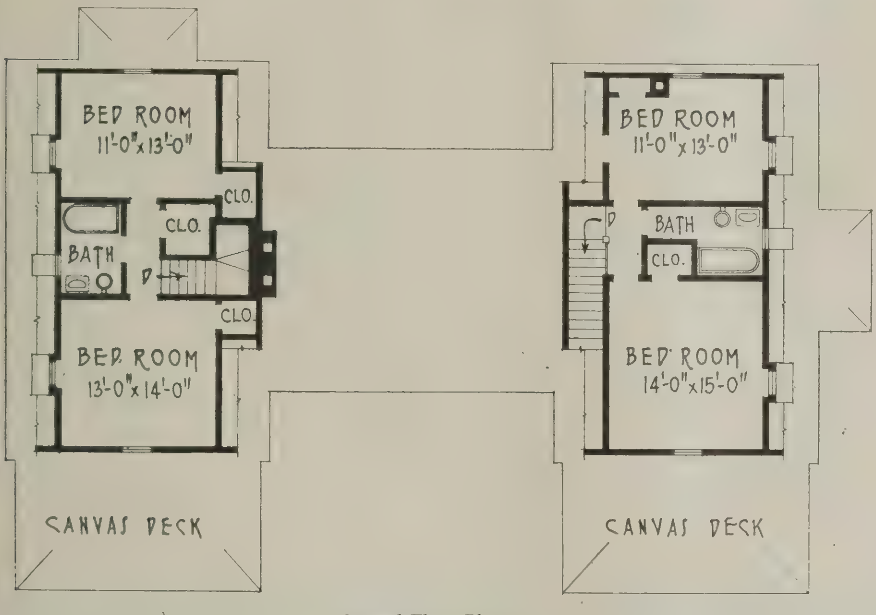
BUILDING a house may be one of the pleasantest things in the world, or it may be sheer misery, depending first upon the temperament of the house builder and second upon the competence of the architect and contractor who are jointly responsible for the carrying out of the owner's ideas as to what a house is. To get the most fun out of building, and to achieve the best results, a certain amount of knowledge of the methods of building is necessary; not perhaps of the actual mechanical processes of mason and carpenter work or plumbing, but of what the relationship is between the owner and the people employed to do the work.

To an architect it is always a new surprise when he finds that a man, contemplating an enterprise which involves a very considerable sum of money, knows so little how to disburse it wisely; and yet it should not be surprising; most people build only once, and the building business is in many ways different from any other business in that one buys something which cannot be seen in advance, even in sample. Also very many people cannot "read drawings"; in other words, they are unable to visualize what they are buying.

Yet building of any kind should be a source of infinite pleasure to all concerned in it; it is in a limited way an act of creation; it should be the creation of something not only useful, but beautiful; and when the structure is a home, it is a thing which should be more than an inanimate object, a mere shelter from wind and weather; it should possess a personality, fitting to its owner and of infinite and continuing delight to him.

I think that more unpleasantness in building arises from two causes—distrust of the architect and builder, and constant interference with workmen,—than from all other causes combined, and no building can be done happily where these things exist. I have clients who go to the job constantly and bring happiness with them not only to the architect and the builder but to the individual mechanics; they are interested in our work—that pleases us; they believe in us—that flatters us, and we all of us work to give them the kind of house they want; changes are made promptly, cheaply and with a feeling that they are for the best. Then there is another type of client who never puts his foot on the job without nagging or fault finding or complaining that he "was never informed of this" or "he didn't understand this was to be that way." In the end we grow to hate the sight of him; we do what he wants not because it is best for the job but to still his querulous voice, and he pays for every change and pays well for it. We have no pleasure in the work, and he has none either, unless he is one of those happily rare individuals who takes pleasure in making other people unhappy; and nine times out of ten his changes will have hurt rather than helped his house.

Detail of the Living Room Entrance

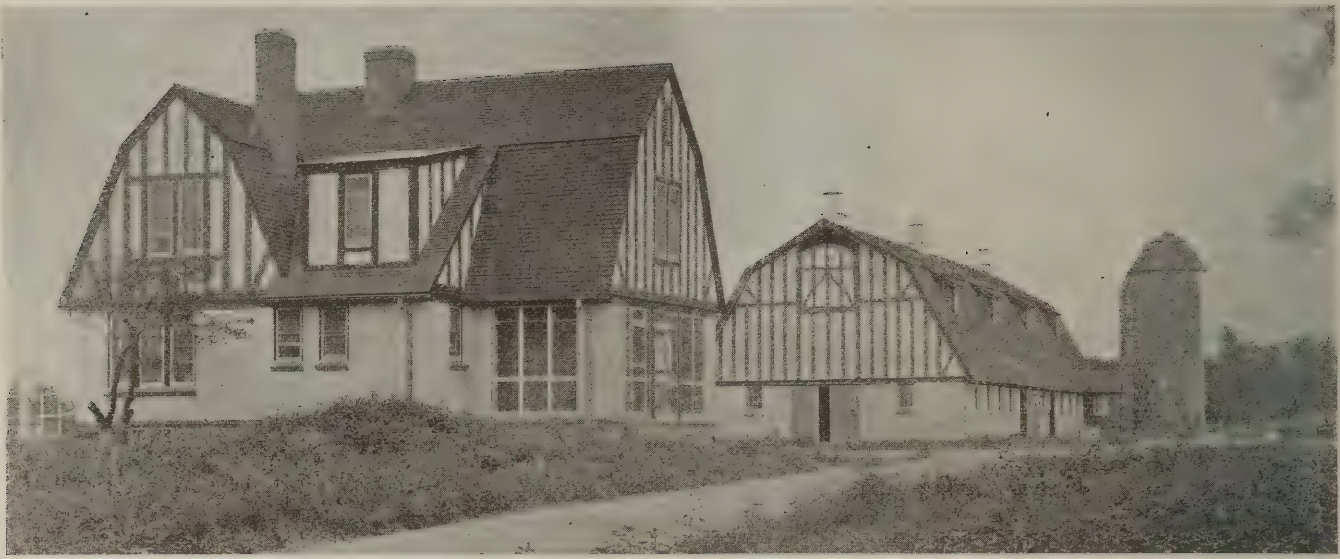


Second Floor Plan

The client I like best, and the one the builder prefers, is the owner who understands plans, reads his specifications, knows what the builder has agreed to furnish him and insists on it, but does not insist on the builder doing something he has not agreed to do or that is foolish in itself. Above all, we fear the man who accepts every piece of advice given him by casual acquaintances who have just built themselves a house. If your architect is worth hiring, his advice is worth following; if you select your builder because he knows his business do not assume he is trying to "do" you because his methods differ from those of some other builder you know of. Meet your builder with confidence and good temper, and he will respond with an especial effort to give you not only the value of your money but a little more for kindness—you can capitalize courtesy.

Another thing that the owner should never do, and which very many owners do do, is to give instructions to individual workmen on the job. If you want something done, tell the architect if there is one; if there isn't, tell the builder. The individual workman or even the foreman has not any authority to do what you want; he is not your employee and you have no business to direct somebody else's employees. You are entitled to inspect your house as much and as continuously as you please.

Your contract provides for what you shall do when you change your mind; follow that and you will be contented in the end; but walk about the job telling the plumber's man to move the bath tub to the other side of the room and the tinsmith to put that down-spout around the corner, and you will either find your instructions are not followed, or at the end of the job you will have a bill for extra work which will make you sorry for yourself, and you will have ordered every item without realizing that you were authorizing an extra, and for which you must pay.



Making Farm Buildings Attractive

DURING a recent automobile trip through the farming section of Northern Illinois the editor of the BUILDING AGE was struck with the attractiveness of one group of farm buildings that were better looking than the great majority of farm buildings. In this case a pleasing difference was noted in that the owner took particular care in their erection to get a pleasing exterior appearance, not only in house and barn, but in the general grouping, fences, entrances, etc.

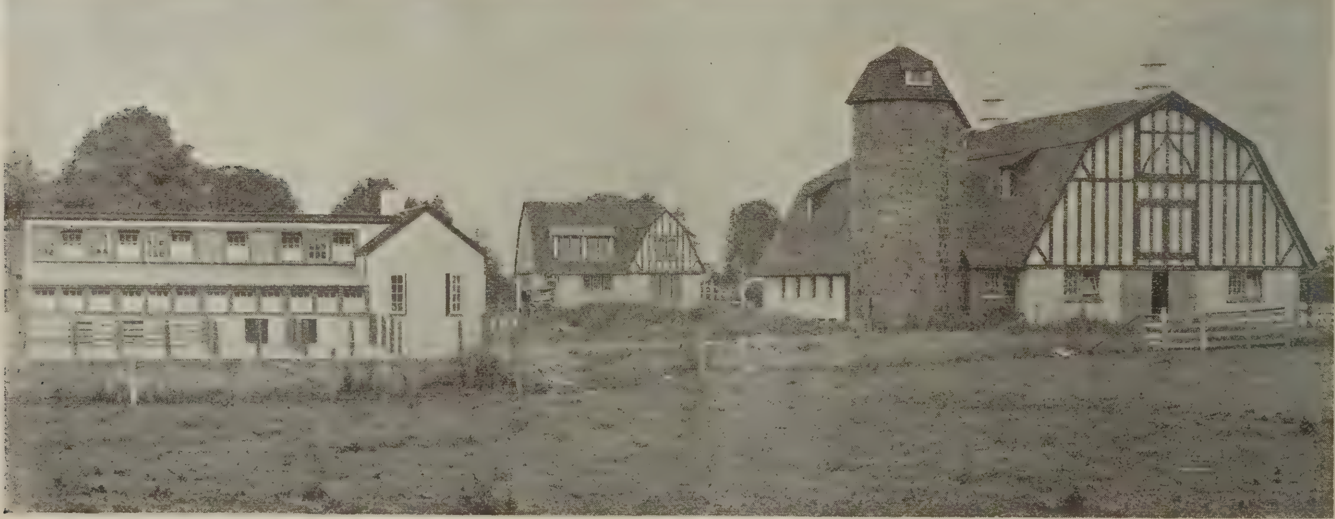
The two pictures presented herewith show how the use of English half timber work transforms the appearance of a barn that harmonizes with the architecture of the farm house. Note the design of the lattice fence and arched openings that tie the house and barn together in one group so that it pleases the eye.

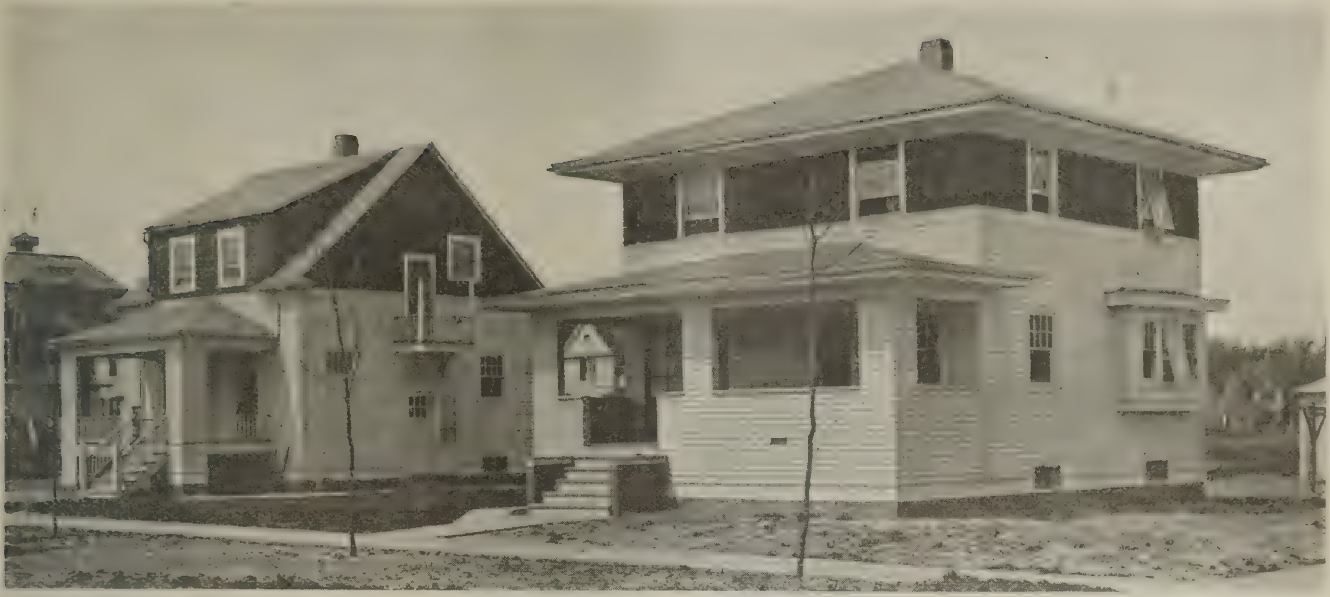
These photographs were taken at the Morse Farm, Libertyville, Ills., and show what can be done to make the farm attractive. It is pretty safe to say that the little extra expense for these simple decorative features have been paid many times over in the advertising value they gave to the farm, not to say anything about the satisfaction of the owner in possessing something that is better than the average.

The progressive building contractor in our rural sections can see in these pictures a chance to suggest better looking farm buildings besides making a more profitable and satisfactory job, one to which he can point with pride and say "I built that" and likewise the owner is better satisfied.

Do a good job and make it as good looking as possible. BUILDING AGE from time to time will publish other designs of modern farm buildings that will look well and be practical. Let us have better farm buildings and equipment and it will mean better farming and stock.

One often hears the words of derision applied to some house—"It looks like a barn"—these pictures show that barns can be architecturally good looking at but little extra expense.





Two Popular Small House Designs

Moderate Cost Five and Six Room Homes for the Average Family

THE above picture shows two small houses of the kind that the average family requires. They were designed and built at Green Bay, Wis., by the Ludolf M. Hansen Co. of that city.

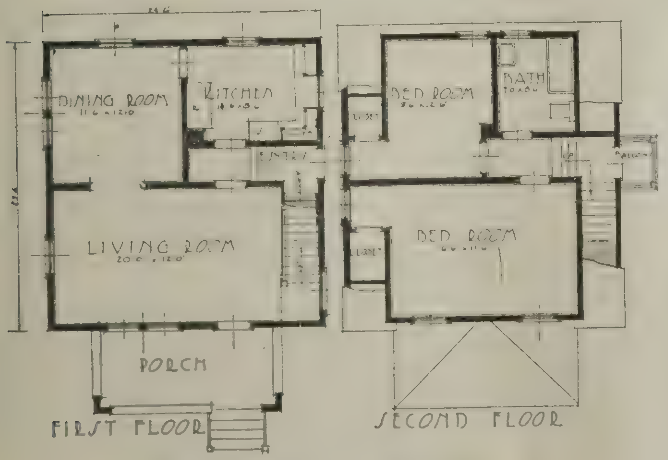
Both houses are covered with drop siding, with their upper portions shingled so to give a little contrast. They are both good examples of what can be erected for a minimum amount of money.

Houses of this sort are always a safe investment as one can realize their cost at any time—small, low cost houses are always in demand. It is the large house with individual ideas carried out to the extreme that is sold at a sacrifice.

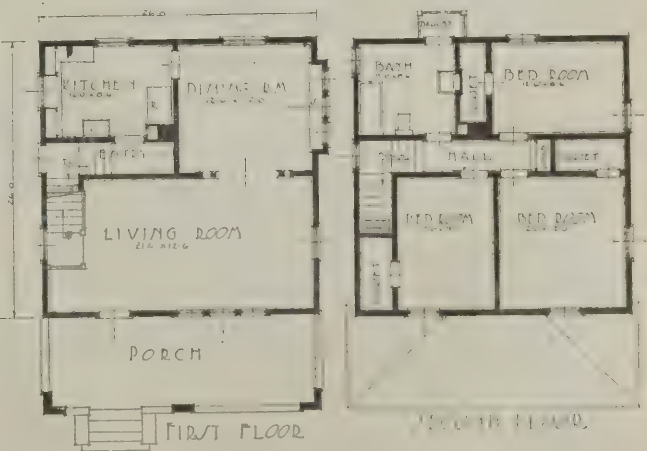
In the floor layout of these two designs they are somewhat similar. In the six room house the rooms are somewhat larger than those of the five room house. In both designs the upper hall space is small, but all rooms open from it conveniently. Each bedroom has a large closet and a linen closet is provided in the upper hall of the six room house. The bath rooms are of good size. The layout of the kitchens are convenient, plenty of cupboard space is provided. Two laundry tubs are placed in the cellar.

The windows in all rooms have been so arranged that there will be proper space for the placing of the furniture besides preserving a balance in the outside design.

Both of these little houses deserve careful study by every contractor, they are the result of a good deal of investigation by the progressive men who erected them, of just what the average family desires for a home.



Floor Plans of the Five Room House



Floor Plans of the Six Room House

A Successful Wood Working Business Built Up on Sound Common Sense Principles

Philip A. Feigin Introduces Efficiency In Shop Layout and Method of Estimating

EFFICIENCY — system—economy. These words do not sound good to us. They have a bad taste. They are even somewhat in disrepute today, because they have been shouted from the housetops and proclaimed on the highways by too many false prophets—quacks of the industrial world, so to speak.

But, when it comes down to brass tacks, we may not like the word "efficiency"; we may turn up our nose when we hear someone talk about "system"; we may listen with polite contempt to a sermon on "economy." But, down in our hearts we know that no business is successful that is not, at the same time, efficiently, systematically and economically handled. For, after all, what is efficiency if it is not the prevention of waste? What is system if it is not the elimination of useless efforts? What is economy if it is not the stopping of all leaks and getting the biggest production for the least cost? And our hat always comes off to the man who recognizes these factors and successfully weaves them into his business enterprise.

Philip A. Feigin, M. E.

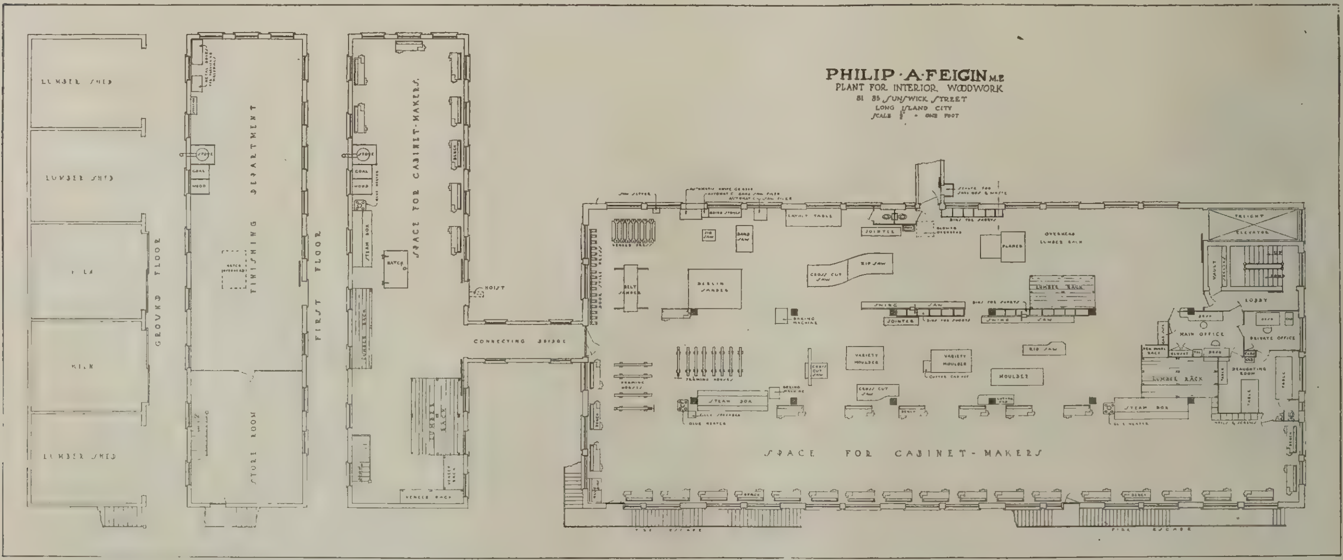
We wish that every reader of Building Age had the opportunity to see the workshop of Mr. Philip A. Feigin in Long Island City. Mr. Feigin comes from a family of woodworkers. After graduating from Cornell University in 1903 he followed up mechanical and electrical engineering with the General Electric Company, Western Electric Company and the United States Navy.

But the call of the shop was too much. The wood working instinct was in his blood. It was his passion. He resigned from the Navy about 13 years ago to join his father and brother in the manufacture of interior woodwork.

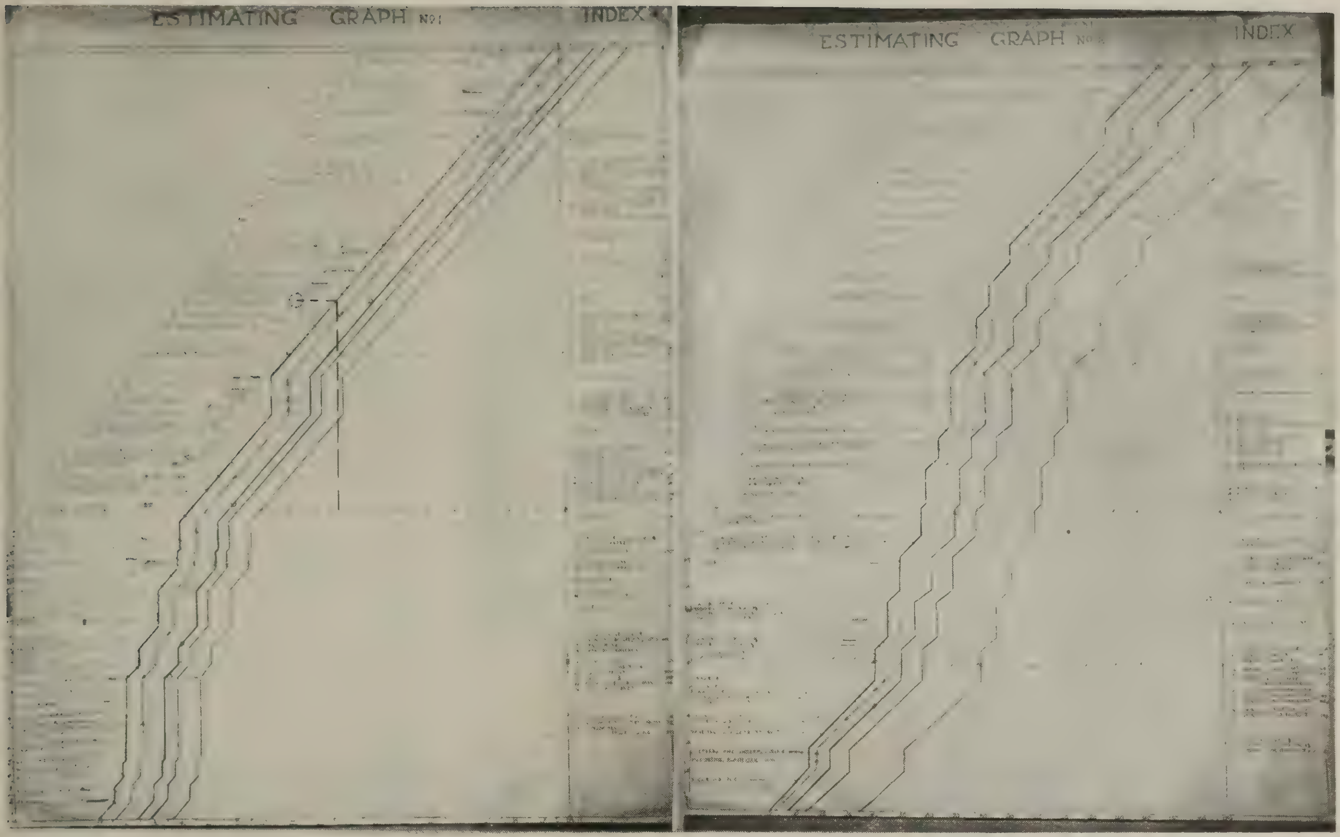
Mr. Feigin's aptitude for quick, reliable estimating as well as thorough prompt work soon gained many friends.

Mr. Feigin's love for system and efficiency is reflected in his shop, which is laid out so that no space is wasted. Stock can be handled on one machine without interfering with men working elsewhere. Due regard is given to the grouping of the machines to facilitate the orderly progress of a job through the shop from the time it enters as rough lumber until it leaves, a finished product.

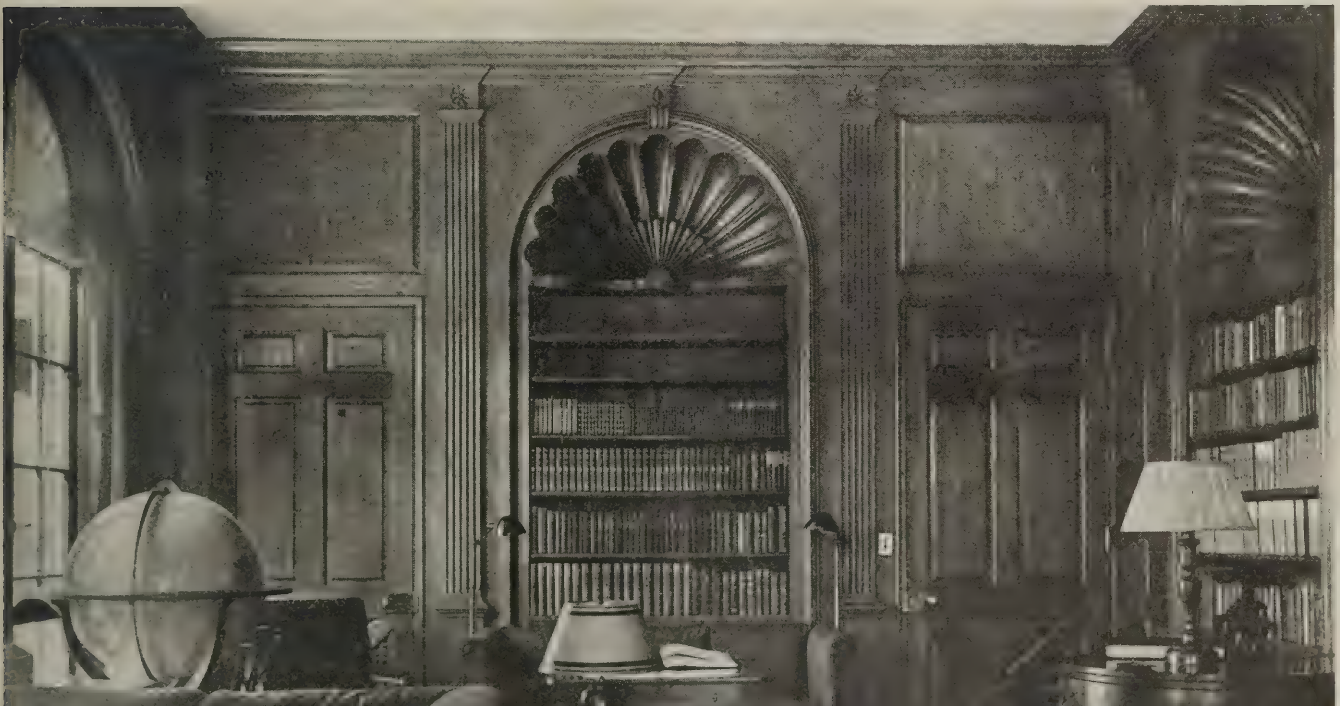
Tools are convenient. A dentists' cabinet renders good service for keeping cutters so that they may be quickly



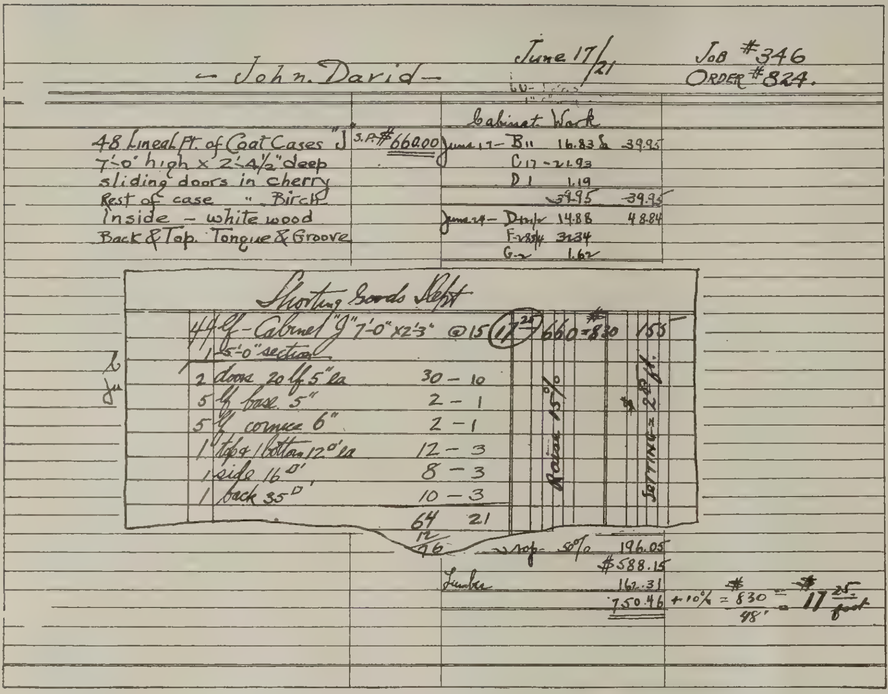
The Layout of the Shop



Estimating Charts



Philip A. Feigin, Interior Woodwork **The Robinson Memorial Room at Quantico, Va.** **Murphy & Dana, Architects**



— John. David —
June 17/21
Job #346
Order #824.

Cabinet Work

48 Lineal ft. of Coat Cases "J"
7'-0" high x 2'-4½" deep
sliding doors in cherry
Rest of case " Birch
Inside – white wood
Back & Top. Tongue & Groove

S.P. #660.00

June 17 – B11 16.83 39.95
C17 – 21.93
D1 1.19
39.95 39.95
June 24 – D 14.88 48.84
F 32.34
G 1.62

Sporting Goods Dept

44 lf – Cabinet "J" 7'-0" x 2'-3" @ 15 17.25 660 = #830 155
1 5'-0" section
2 doors 20 lf 5" ea 30 – 10
5 lf base 5" 2 – 1
5 lf cornice 6" 2 – 1
1 top & 1 bottom 12° ea 12 – 3
1 side 16°' 8 – 3
1 back 35° 10 – 3
64 21
12
76
Raise 15%
Setting = 2 ft.
50% 196.05
$588.15
Lumber 162.31
750.46 + 10% = #830 / 48' = #17.25 foot

A Page from the Book of Cost Records

found and replaced when finished. And, by the way, the cabinet is centrally located so that it is convenient to all the workmen. No wasted footsteps.

One side of the shop is fitted up with benches for the cabinetmakers. Above the benches are racks for strips of molding, etc. There are no strips on the floor, in fact, nothing is allowed to lie around. The whole shop looks like Sunday and you immediately feel the guiding spirit of efficiency, system and economy that is behind the whole organization.

The same system is carried out in the lumber storage racks. When lumber is received it is stored in its proper rack. A graduated scale on the upright posts tells at a glance the number of feet of each kind of lumber in the pile. This gives an instantaneous check on deliveries and lessens the work of inventory.

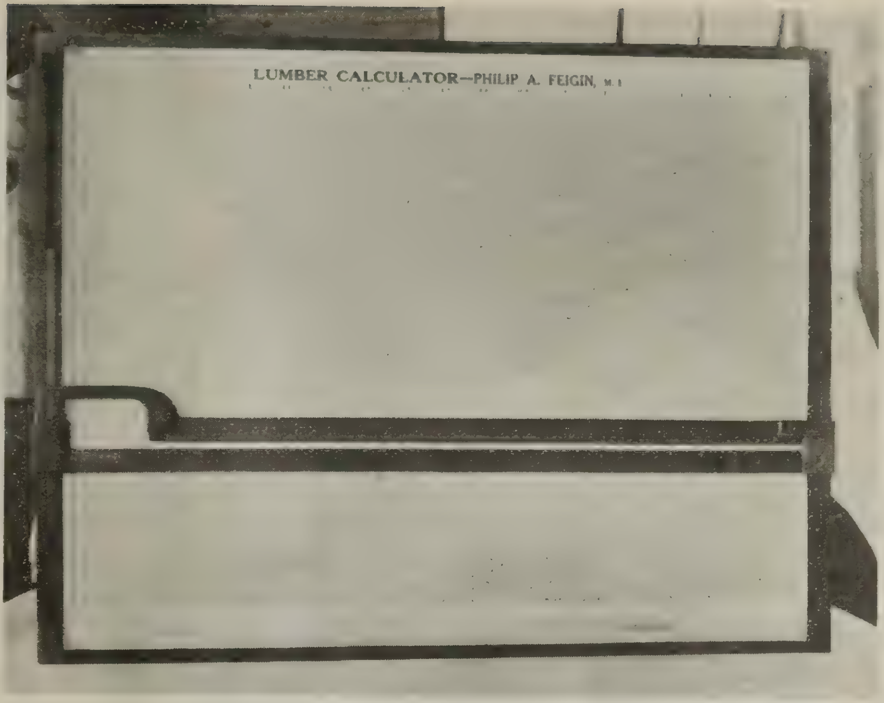
Near the rip saw are bins for the short pieces. There is no waste in this shop. No man cuts up a large piece without first going to the bin for "shorts" (which by the by is on his way to the long lumber racks).

The attention that has been given to details is striking. Each machine is provided with rubber floor mats to prevent accidents. Waste of nails has been reduced by giving each mechanic a small chest of nail drawers, each drawer holding one size of nails. On the nail bins the covers are so hinged that they cannot be left open. While the mechanic fills his little drawer he must hold open the cover and as soon as he lets go the cover drops of its own weight. Nails of different sizes cannot find their way into the wrong bin and the mechanics do not have a number of small piles of nails scattered on the benches to get lost. The yearly saving is considerable.

The office is even more interesting than the shop. Here, also, Mr. Feigin has introduced efficiency and system. His cost system and estimating charts are models for study in many branches of industry. Labor costs are kept with the help of "time ticket," which is supplied to each man at the beginning of the week. Space is provided for listing 12 different jobs during the week and the man records the number of hours spent on each job. These tickets are checked against the time clock record. The weekly labor on each job is the total of the vertical columns. The columns totalled horizontally across are the number of hours worked per day. And the sum of the totals for each job must check with the sum of the totals for each day, namely 44 hours where it is a 44 hr. week. Mr. Feigin designed and uses an interesting labor calculator where the labor cost of a job is read instantly when the "time spent" and "mechanics rate" are known. Space does not permit illustrating it.

Board feet of lumber are quickly calculated by Mr. Feigin's estimators by means of another chart, simple but accurate. The figures at the head of the first six columns also appear on the sliding guide and read "inches thickness of stock." The light figures in these columns read "inches width of stock." The black figures at the head of the other columns

The Lumber Rack



The Rapid Lumber Calculator

(from 1 ft. to 20 ft.) also appear on the guide piece and read "feet length." The light figures in the same columns read "board feet." For example, find the board feet in a piece 2″ thick, 4″ wide and 16′ long. Set the 2″ on the sliding guide under the 4″ in the same column and read directly over the 16′-0″ on the guide 10.7 feet, board measure.

For quickly estimating cost of various kinds of interior woodwork Mr. Feigin has reduced a wealth of cost data gathered over a period of 10 years to the form of estimating charts, which are reproduced here. For, example, item No. 38 is a turned, fluted, column.

To find the cost of making this of white wood read across from the center of the column to the diagonal line marked "white wood." Then read down vertically to 9.8c per inch foot.

Mr. Feigin keeps an accurate personal check on all estimates. A loose leaf record from his estimate file is reproduced herewith. This particular job was for 48 linear feet of coat cases, as described, and was estimated at $660. When the job was completed it was found to have cost 90 dollars more than estimated, or $750.46. With 10 per cent. added this became $830, or $17.25 per linear foot, instead of $15.00 per foot as had been estimated. A note was made immediately to raise this figure 15 per cent. and no error will be made on future estimates.

When Mr. Feigin was endeavoring to introduce his ideas of efficiency into his business, he realized that the team work and co-operation of his men was absolutely necessary. But if he expected team work he knew that he must make clear to them his view point—what he was driving at—the psychology of the business, as he terms it. He, therefore, picked 12 of his men and paid for a complete course in psychology for them in the Y. M. C. A. The results proved the wisdom of this move and he feels well repaid for his efforts.

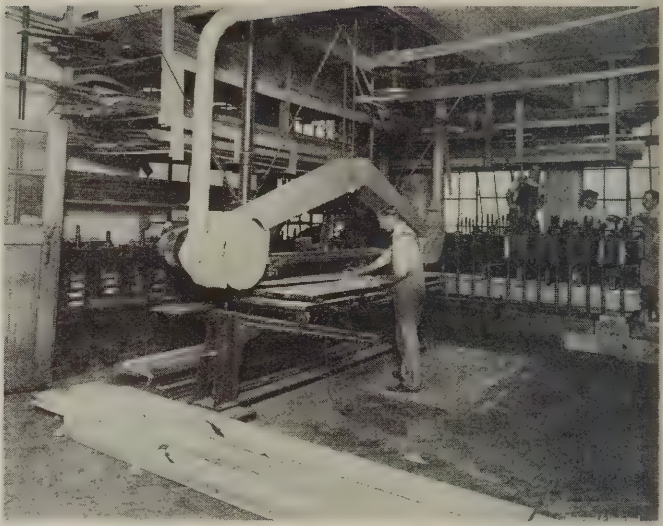
The Rip Saw and "Short Length" Bins

Due to the wonderful team work and the inspiration the men get working under ideal conditions, harmony and artistic results are obtained in almost all of the work that the shop turns out.

Recently a memorial room was constructed for the late Captain Robinson, a son of Mr. Robinson the director of the Metropolitan Museum of Art. The room was designed by Messrs. Murphy & Dana and the commission to construct this room at Quantico, Va., was given to Mr. Feigin. Mr. Feigin had to copy the character of this room from the Colonial Room in one of the wings of the Metropolitan Museum.

Mr. Feigin's efficiency and knowledge in estimating, of which he is a pioneer, has been recognized by Columbia University, American Institue of Architects, Art in Traders Clubs and Architectural League.

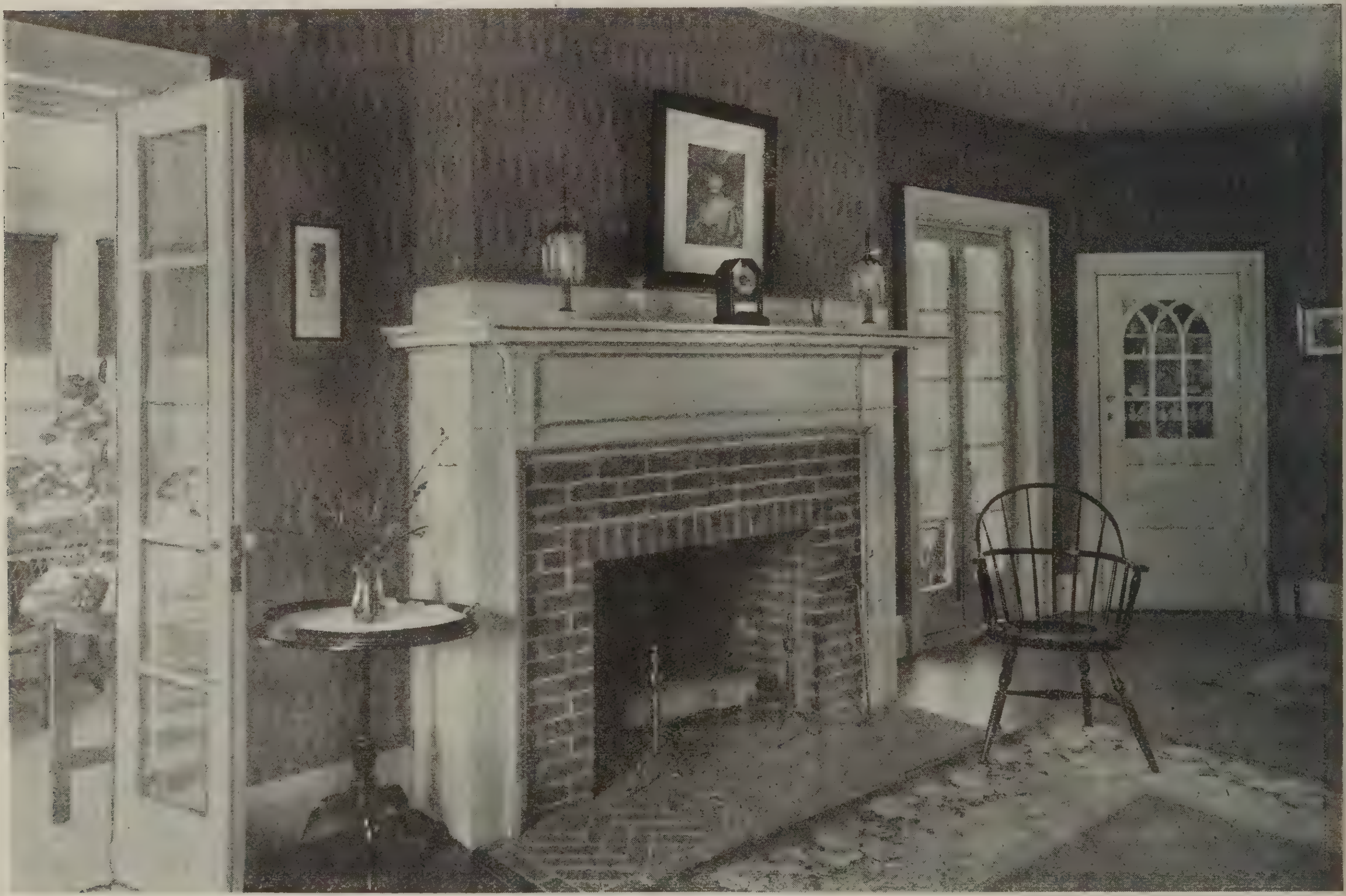
The leading architects, decorators and builders in New York have recognized Mr. Feigin's work and efficient



The Arrangement of Benches **Views in the Feigin Wood Working Plant** **The Sander and Veneer Presses**

organization, and have entrusted him with such contracts as the Citizens' National Bank, Cammeyer Shoe Show Rooms, Straus Building, all in the city of New York, and the Robinson Memorial Room at Quantico, Va., in the officers' club.

In Mr. Feigin's success all building should find inspiration to put forth their best efforts in turning out creditable work. Pleased customers are what count these days of keen competition and the only way to secure them is by being faithful to your work. Of course to make a real success of any business you must like the kind of work you are undertaking, getting real pleasure from it in turning out a good job. This kind of right feeling cannot help being reflected in the work turned out and this is true of Mr. Feigin's work and explains why he has been successful in his chosen line of work.



A Fireplace of Colonial Design

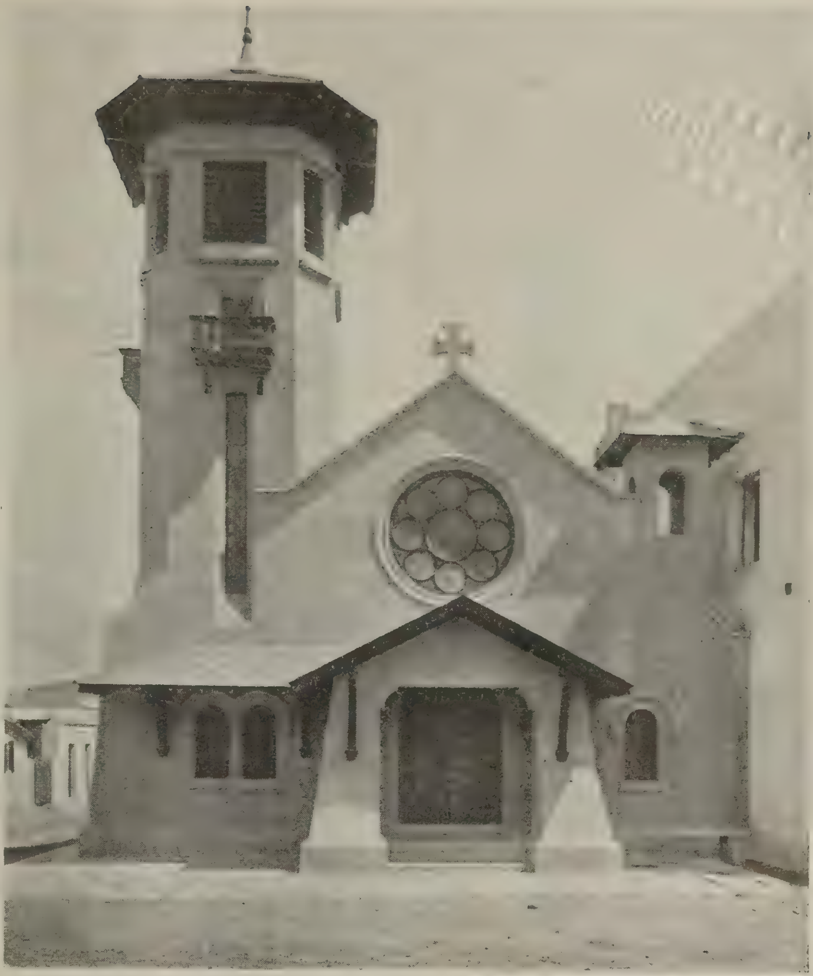
A Concrete Church

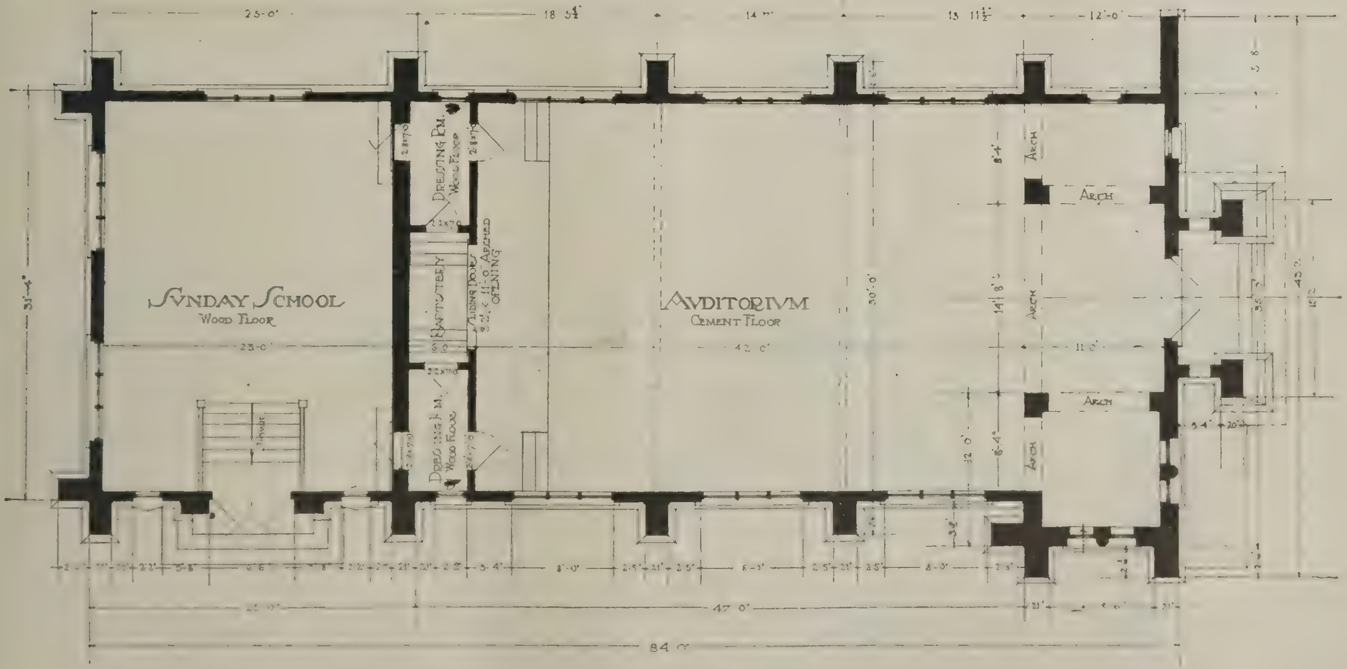
An Interesting Example of Porto Rican Building

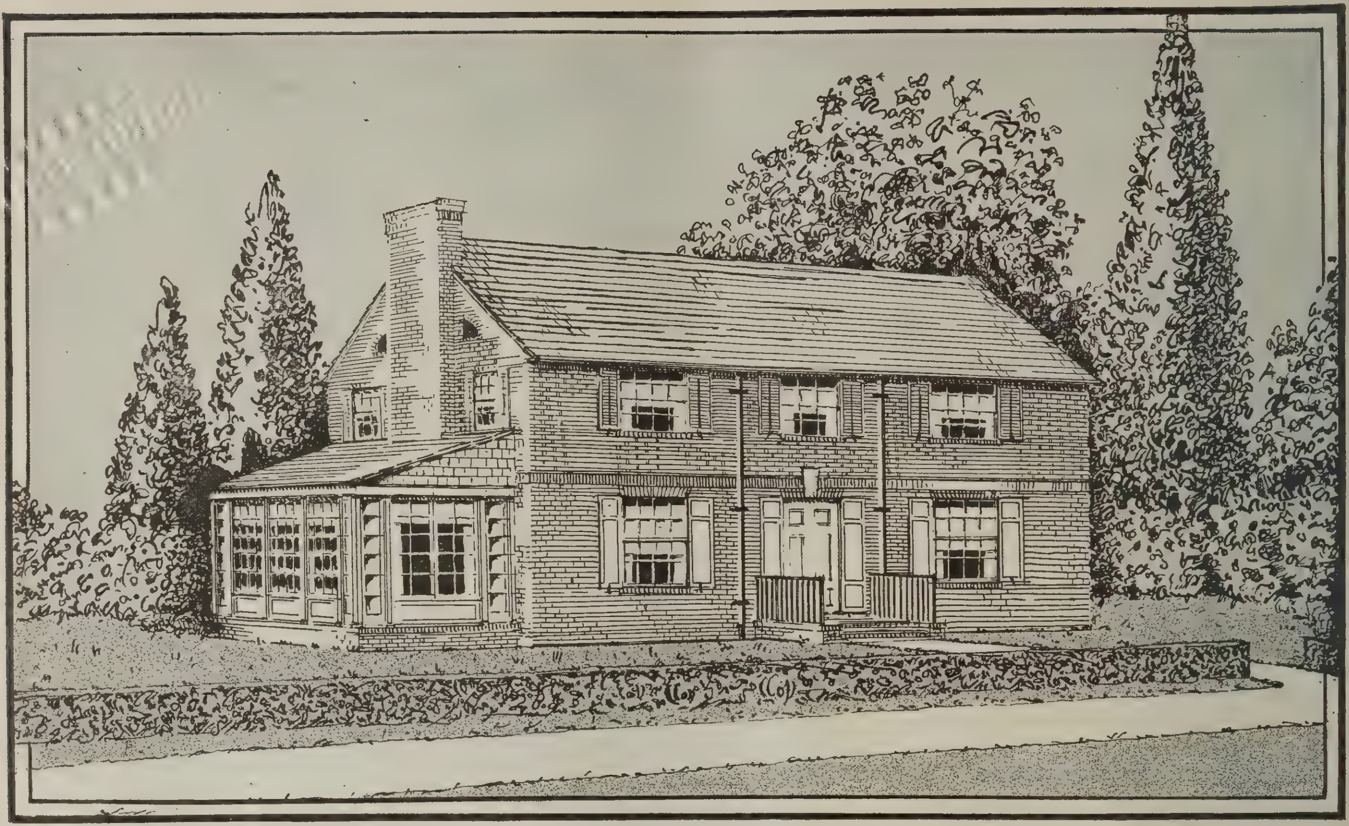
BUILDING where materials cannot be had readily is somewhat of a handicap and any efforts under these unusual conditions deserve commendation. Our nearby islands have but little native material to draw on and they depend on the States for their main supply.

It is always of interest to see the types of building that other people build and of special interest is the church shown here, which was built in Porto Rica of monolithic concrete construction.

This church was built entirely by native labor and is a creditable piece of work. The roof is supported by bow trusses of plank frame construction—these having a clear span of 30 feet. Buttresses carry the weight of the trusses and only a thin curtain wall is necessary between them.







A Brick House of Moderate Cost

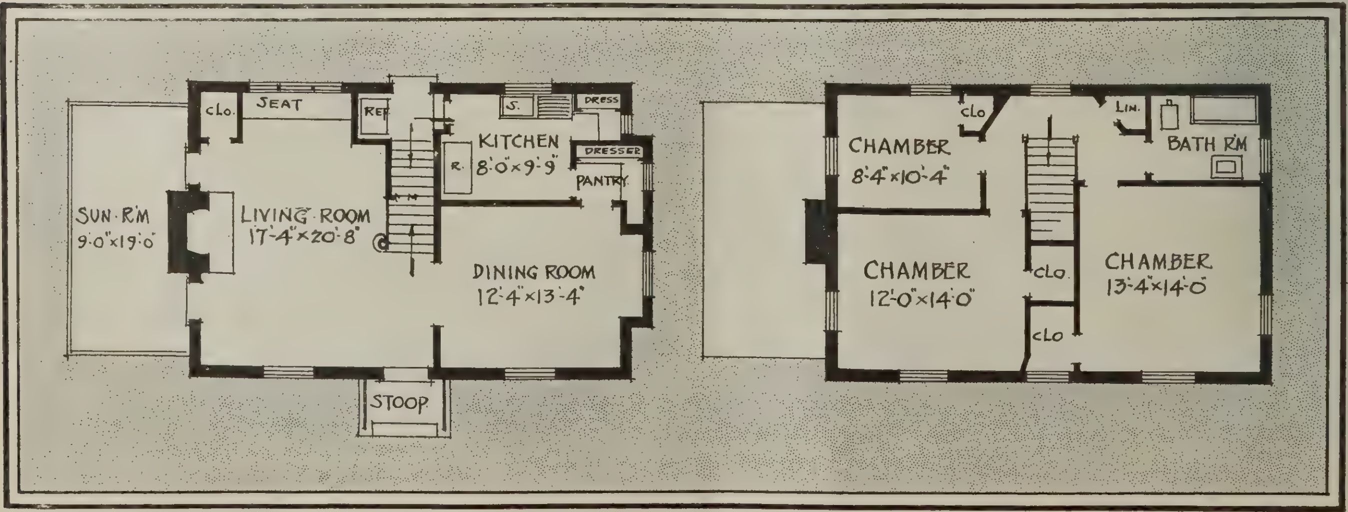
BRICK houses are favored by many and this design shows a conveniently arranged home of this construction. The exterior is simple yet dignified along Colonial lines. The roof could be covered with slate or asbestos shingles of different colors so as to give a blended effect. One enters the large living room with its inviting open fireplace and on the opposite side is the Colonial stairway, the usual central hall being omitted.

Specially Designed for BUILDING AGE Readers

By Philip Resnyk, Architect

Complete working plans and specifications for this home will be furnished for a nominal sum; a quantity survey is given on opposite page.

BRICK readily lends itself to produce an artistic home, one that will be lasting and for which repair bills will be slight. The first cost, however, is but little more than a frame structure. A brick house will also save money in the cost of heating and likewise it will be a cooler house in summer. This house can be built entirely of common brick which mellows with age or face brick may be used for the exterior.



Quantity Survey of the Brick House

Shown on Previous Page

THE amounts listed here are for purpose of estimating. All measurements are "Net." Amounts for such as sheathing, roofing, etc., are given by area, with no percentage allowed for waste and matching of lumber. Small items have not been listed. These depend on local conditions such as clearing plot, drainer, supplies, etc. Minor outs are disregarded. Where the word "Item" appears in amount column it indicates that expense for material in question should be figured in lump sum.

Loam 15′ 6″ around house, 10″ deep	75 cu. yds.
Excavation for cellar	168 cu. yds.
Excavation for trenches	10 cu. yds.
Excavation for footings and piers	18 cu. yds.
Concrete footings and piers	15 cu. yds.
Concrete for walls	40 cu. yds.
Concrete for basement floor	200 sq. ft.
Cement porch floor	10 cu. ft.
Fireplace damper for 40″ opening	1
Ashpit door	1
Ashtrap door	1
Mantle	1
Metal thimble for heater flue	1
Cleanout door	1
Fireplace firebrick	120
Brickwork—common	15,600 brick
Brickwork—face	14,400 brick
Plastering—three coat work	960 sq. yds.
Plastering for cellar—1 coat	69 sq. yds.
Lumber. Sheathing for coal bin partition	100 sq. ft.
Sills, 2″ x 6″ for roof beams	120′ b. m.
Girders, 6″ x 10″	54′ b. m.
Joists, 1st and 2nd tier, 2″ x 10″—14′ 4″ longest timber	1,280′ b. m.
Attic tier, 2″ x 4″ (also hanging ceiling for porch)	750′ b. m.
Roof rafters, 2″ x 6″	700′ b. m.
Studding and plates, 2″ x 4″	1620′ b. m.
Sheathing (for slate roof) 1″ x 6″ NCP	1500 sq. ft.
Shingle strips (for wooden shingle roof)	3400 lin. ft.
Furring, 1″ x 1½″	1700′ b. m.
Bridging, 1¼″ x 3″	400′ b. m.
Rough flooring and sheathing, ⅞″ x 6″ N.C.P.	850 sq. ft.
Finished floors (living and dining), ⅞″ x 2″ oak	700 sq. ft.
Finished floors (balance) Comb grain pine ⅞″ x 2½″	100 sq. ft.
Doors:	
Exterior front door, 2″ thick, 3′ 2″ x 7′	1
Rear door—1¾″ thick, 2′ 8″ x 6′ 8″ (9 lights)	1
Porch (French doors)—1¾″ thick, 2′ 6″ x 7′ (18 lights)	2
Interior; 1 panel—	
1¾″ thick, 2′ 6″ x 1′	2
1′ 10″ x 7′	1
2′ 6″ x 6′ 8″	4
2′ x 6′ 8″	4
1′ 8″ x 6′ 8″	1
Hanging rods	18 lin. ft.
Medicine chest mirror door	1
Cellar windows, 1½″ thick, 3′ x 4″ thick	2
1′ 8″ x 1′ 4″	1
2′ 4″ x 1′ 4″	1
3′ 10″ x 1′ 4″	1
Enclosed porch sash:	
1½″ thick, 1′ 5″ x 7′ 2″	6
5′ x 6′ (pair)	5
First floor; double hung, 3′ 8″ x 5′ 2″	2
Double hung, 2′ 4″ x 3′ 6″	1
Double hung, 3′ 2″ x 3′ 6″	1
Casement, 3′ 10″ x 2′ 6″	1
Casement, 1′ 8″ x 3′ 6″	1
(Double hung) triple mullion each window, 2′ 4″ x 4′ 10″	1
Second floor (double hung):	
2′ 10″ x 4′ 2″	6
3′ 2″ x 4′ 2″	1
3′ 8″ x 4′ 2″	2
Attic, casement ¼ round, 1′ 8″ radius	4
Note: All windows to include sash and frame.)	
Roofs	14 squares
Facia, 1″ x 6″	140 lin. ft.
Crown mould, 6″	90 lin. ft.
Soffits, 1″ x 8″	64 lin. ft.
Soffits, 1″ x 4″	20 lin. ft.
Blinds with slats	7 pairs
Blinds with panels	3 pairs
Window seat	1
Gutters, O. G. galvanized iron	92 lin. ft.
Leaders, 3″	82 lin. ft.
Leader elbows	10 lin. ft.
Tile leader drains, 4″ tile pipe	80 lin. ft.
Tile leader drain elbows	5
Iron lintels, 5″ I beam, 9.75 lbs	2-15 ft.
8″ channel beam, 11.25 lbs	1-10 ft.
4″ angle iron	3-5 ft.
$\frac{5}{16}$″ iron plates	1-5 ft.
	3-4 ft.
	4-4′ 6″
Iron rail: (1 left hand) (1 right hand)	2
Interior trim base:	
⅞″ x 8″ (living and dining room)	90 lin. ft.
⅞″ x 6″ (balance)	190 lin. ft.
⅞″ x 3″ (balance)	60 lin. ft.
Quarter round mould for base	340 lin. ft.
Picture mould	280 lin. ft.
Stairs; 1st and 2d floor:	
Treads (starter)	1....4′ 6″
Treads (open ends)	6....3′ 10″
Treads (boxed)	6....3′ 0″
Stringer casing	7 lin. ft.
Skirting board	22 lin. ft.
Risers (curved starter)	1
Risers (straight)	13
Rail, with casement	7′ 6″ long
Newel post, 6″ col.	8′ 2″ high
Newel post, 3½″ x 3½″	2
Spindles, 1¼″, tapered	24
Cellar stairs:	
Stringers	2-14 ft.
Treads	12-2′ 10″ each
Rail	2-10
Dresser kitchen	1
Pantry	1
Shelving, 1″ x 12″	20 lin. ft.
Tile work, floor	52 sq. ft.
Wall, 3″ x 6″—4′ 6″ high	110 sq. ft.
Sanitary floor cover	26 lin. ft.
Sanitary cap	26 lin. ft.
Interior door and window casings, 4½″	900 lin. ft.
Window stops	385 lin. ft.
Window beads	205 lin. ft.
Door stops (interior)	220 lin. ft.
Door jambs (interior)	220 lin. ft.
Door jambs (exterior) rabbeted	70 lin. ft.

Allow for work not listed in survey:
- General or overhead costs.
- Grading walks, planting, etc.
- Connection for water, sewer, gas, etc.

Insert sub-bids for other trades:
- Hardware.
- Setting Hardware.
- Painting.
- Plumbing.
- Heating.
- Electric work.
- Fixtures.

Mitering Rake and Level Mouldings

By RICHARD M. VAN GAASBEEK
School of Science and Technology, Pratt Institute, Brooklyn, N. Y.

A RAKING moulding is a term used for mouldings which are inclined; as, in a gable, a moulding following the pitch or slope of the roof. To make a miter between a rake moulding and a level moulding, the profile or outline of one of them must be modified in order that the joint may be made. The cut for the level moulding is an ordinary miter cut or angle of 45 degrees. The cut for the rake moulding is the same as a jack rafter top and side cut. These cuts can best be made in a miter box using either the graphic method or the steel square.

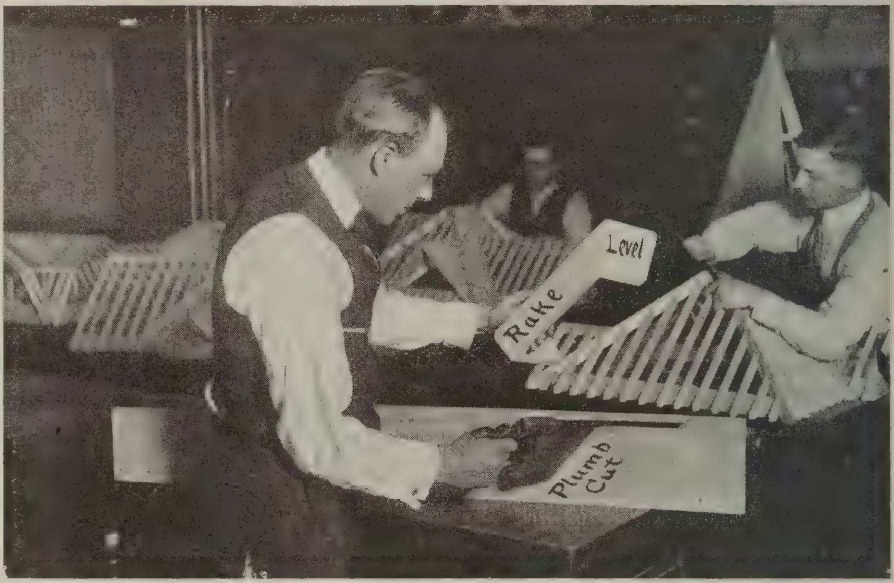


Fig. 2.—Making the Plumb Cut

To determine the profile or outline for a raking moulding proceed as shown in figure 1. Draw the normal moulding 1, extending the upper and lower fillets diagonally to correspond to the pitch of the roof on which the moulding is to be used. The profiles will vary as the pitch of the roof changes. Divide the outline of moulding 1 into any number of parts and from these points of division erect perpendicular lines until they intersect the horizontal line A-B-C. From these same divisions on the outline of the moulding, draw in lines parallel to the raking or diagonal pitch lines of the roof.

To determine the profile of a moulding which may be applied to the rake or gable, the members of which will intersect and miter with moulding 1, mark off on the pitch line, a short distance from moulding 1, the various divisions A-B-C, moulding 2, figure 1, making exactly the same number and size of parts. This can be very easily done by marking the divisions on a strip of paper and transferring them. From these points of division on the raking line draw lines at right angles to the pitch as at C-D, moulding 2. The intersection of these lines with those drawn parallel to the rake of the moulding will give the points through which the profile of the raking mould may be drawn so that it will miter and intersect with the level moulding.

The return profile which occurs near the top of an open pediment may be determined in the same manner. A short distance from moulding 2, produce a plumb line C-D, moulding 3, figure 1. Mark off on a level line the various distances A-B-C, moulding 1, making exactly the same number and size of parts, using a strip of paper as suggested for transferring them. From these points draw in plumb lines parallel to C-D. The intersection of these lines with those drawn parallel to the rake of the moulding will give the points through which the profile of the level moulding may be drawn so that it will miter and intersect with the raking moulding.

An elevation of the assembled mouldings is shown in figure 2, the moulding in the illustration being made of straight stock to simplify the demonstration of the principles involved.

To miter level mouldings 1 and 3 use an ordinary miter box, placing the moulding in the box, similar to any crown moulding. To miter rake moulding 2, use the same method for determining the cheek cut for jack

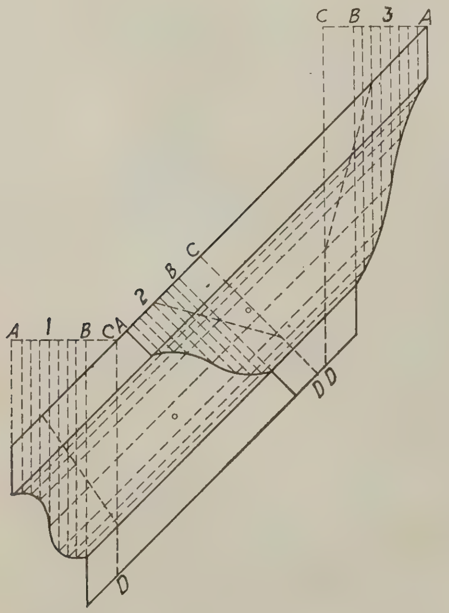


Fig. 1

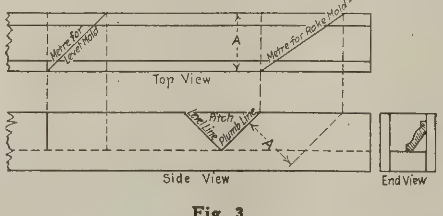


Fig. 3

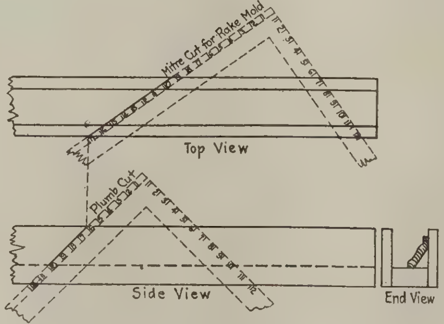


Fig. 4

rafters. Produce a plumb line on the side of the miter box as shown in figure 3. Draw another line parallel to it, a distance apart equal to the width of the miter box, making the distance A on the side of the box and A on the top of the box the same. Square these two plumb lines across the top of the box and connect diagonally, as shown in figure 3. Place the moulding in the box similar to any crown moulding.

These cuts may also be laid out with the steel square, as shown in figure 4, using the run (the unit for one foot of run) 12″ on the blade and the rise in inches per foot 12″ on the tongue, this problem being for a one-half pitch roof. Mark on the tongue for the plumb or cut on the side of the box.

To determine the top cut use the length (bridge measure of the run and rise) 17″ on the blade and the rise in inches per foot 12″ on the tongue. Mark on the blade for the miter or cut on the top of the miter box.

Community Action to Produce More Houses

Recommendations by HERBERT HOOVER, Secretary of Commerce

IN a recent letter addressed to the New York State Realty Convention at Syracuse, Secretary of Commerce Hoover stated that community action was the genuine means of providing more houses. He emphasized as a further point the need for home ownership to succeed the immense proportion of tenantry which is now the rule. He declared that with the increase in the construction of houses will come an increase in employment, the general revival of the construction industry and improvement of business conditions.

The letter recommends the reduction of costs and elimination of waste in construction, and the making of credit available upon such terms as are attractive to instalment purchasers with limited incomes. The problem naturally varies in each community and its solution must be based on an accurate survey of the conditions in each particular community. Before any progress is made it is necessary that the facts be determined, and to do this it is essential that a survey be made by the different elements of the population. Mr. Hoover says further:

"In a broad survey of the difficulties in the country as a whole, and the methods taken in their solution, certain facts need to be determined for each community:

"(1) A determination of the cost of building different types of homes.

"(2) A determination of the ratio of present to pre-war costs with the realization that costs will not for many years return to the pre-war level.

"(3) A determination of the different layers of income in a community in their relation to the cost of homes to be erected.

"(4) A determination of the finances available.

"(5) A determination of the availability of real estate as regards transportation as well as the righteousness of the price.

"(6) A determination of methods by which excessive costs and charges can be eliminated.

"The following notes on constructive handling of the problem are the result of a canvass of the successful efforts being made in different communities.

"In the matter of financing building for purchase on instalment, the real crux of the problem lies between mortgage advances that are acceptable to the savings banks or similar institutions—50 per cent. to 60 per cent. of their value—and the necessary initial advance to enable home builders to start—75 per cent. to 80 per cent.

"A primary security, first mortgage, is available in most communities at reasonable rates of interest. If there is any shortage of such advance, pressure should be brought upon savings banks, insurance companies and savings departments of commercial institutions to devote a certain portion of their funds to this purpose.

"The margin between the first mortgage and the cash payment is usually represented by a second mortgage which gains in its security by monthly repayments on the part of the home builder. Furthermore, it can gain in security if there is attached to this second mortgage the guarantee of the contractor and the builder.

"The heavy discounts exacted on second mortgage notes levy upon the home builder interest rates from 11 to 20 per cent. for this portion of his advances, and are an undue tax upon him.

"The spirit of the community has been called upon with success to provide a fund for second mortgage purposes at reasonable rates of interest, and it is well worthy of consideration in every community.

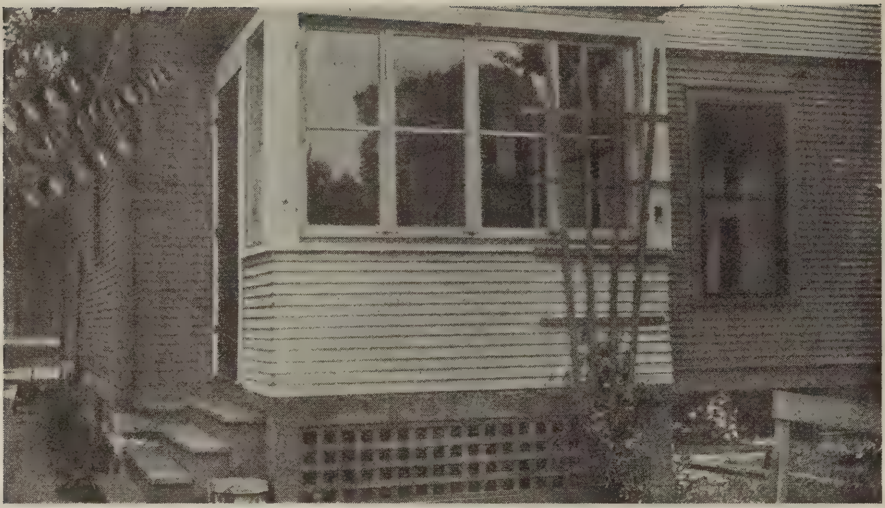
"In the matter of elimination of waste in building, careful local studies need to be made as to the character of building material that can be best adapted in price and other qualifications to the problem.

"Furthermore, in order that housing may be given the advantage and economy of high skill in design and yet not be charged high fees, architects have very successfully established co-operative small house service bureaus, such as that operating in Minneapolis.

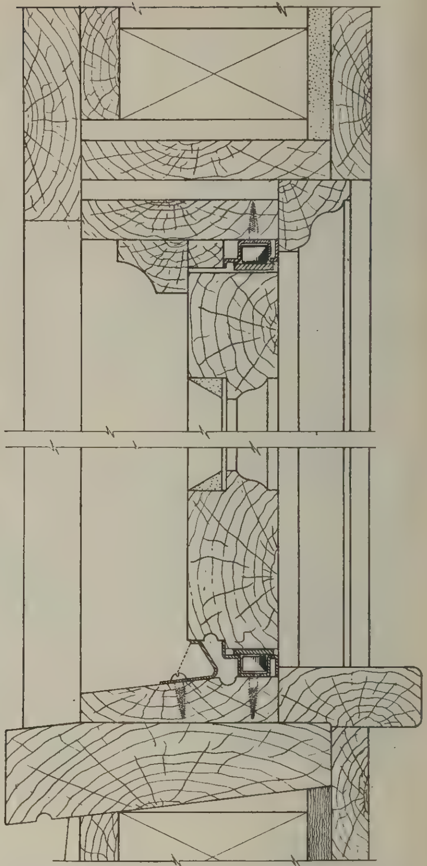
"Other economies in building can be induced by steady remedying of building codes which restrict economic construction. The Department of Commerce Advisory Committee on Building Code is prepared to furnish technical advice in this field.

"Beyond this, co-operation between suppliers of material, contractors and labor, to remove limitations on effort and to give more regular employment, and community agreements to eliminate jurisdictional and other strikes, all contribute to reduction in cost. Even under present price levels, unity of action in this direction can bring the cost of home building to a figure fairly commensurate with present incomes.

"In order that all these things may be accomplished definite community organizations must be created to handle the different interests involved. The problem is a community one, not a problem for the Federal or State Governments. It is only consonant with American tradition that these matters should be solved in this fashion."



How the Porch Is Now



Detail of the Construction, Showing How the Sash Are Operated

Enclosing the Rear Porch

A Timely Suggestion for Securing a Line of Work That Is Now Needed

By E. J. G. PHILLIPS

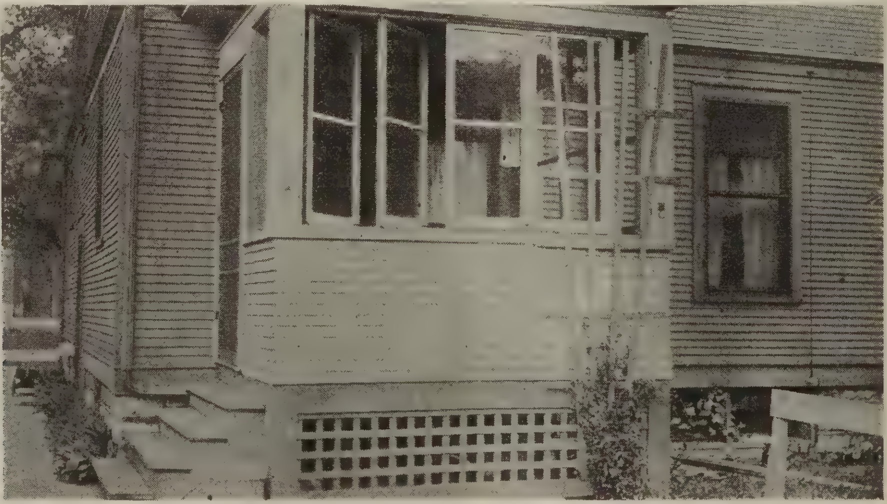
THE remodeled back porch which forms the basis of this article suggests a simple, inexpensive way in which the usefulness of this much neglected part of a house can be increased immensely.

The benefits of an enclosed back porch may not be realized at the time the house is built, but the desirability, if not the necessity of having such a place is almost sure to impress itself upon the occupants' attention before many months have passed, especially when, on account of high building costs, the size of the house has been reduced to the minimum.

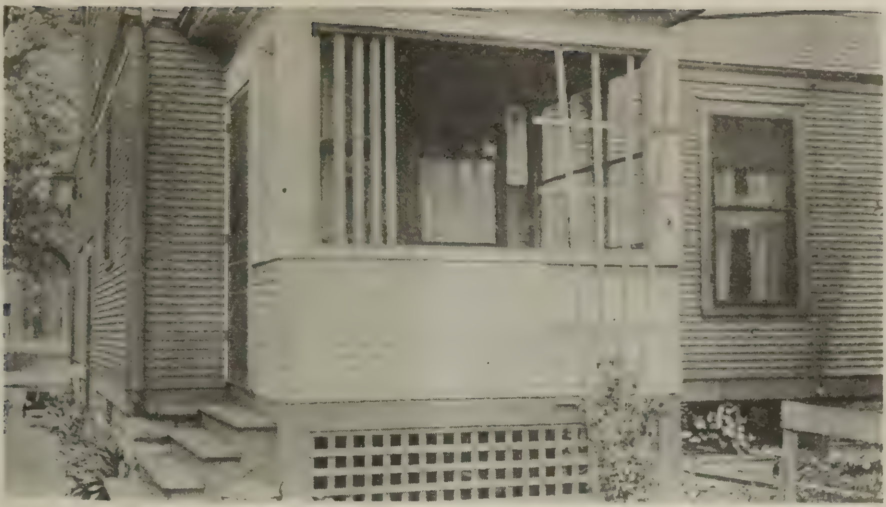
The illustrations herewith show an open porch 7 ft. x 9 ft. was changed, with very little disturbance to the original structure, to an enclosed room annexed to the kitchen. The original porch is shown on opposite page, while the other illustrations show the results of remodeling.

The lower part of the side walls is sheathed and sided on the outside and finished with beaded ceiling on the inside. The upper part of the side walls is composed of sliding sash. From the plan shown on next page, as well as from the other illustrations, it may be noted that four sash are used on the large side, three sash on

Showing the Sash Partly Open



Much Appreciated in Spring and Fall



Showing the Sash All Open

Summer Time an Open Porch

one of the short sides and one sash and a door on the third side of the house.

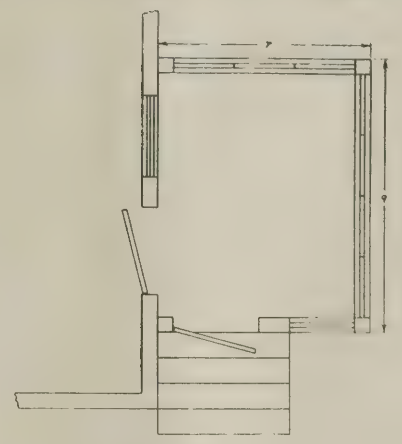
All of the sash on each side are connected together at top and bottom by links which assure uniform movement of top and bottom of sash, prevent tipping and also prevent sash from being blown about by the wind. One sash on each side is hinged to the window frame. The links have small rollers at one end which slide in guides or tracks on the top and bottom of the window frame, as shown in the vertical section.

With these fixtures, the sash, which are shown closed on the opposite page, can be partially opened at any point for ventilation, as shown, or practically the entire window may be cleared by moving all of the sash to one end, as pictured above.

It will be noticed from the illustrations that the sash are made to open inside which eliminates any interference with the large screen panel used to cover the entire opening on each side. The screens are not shown in the illustrations. Sash opening inside are easily cleaned because both sides are accessible from the inside of the building.

The windows are generally left open during the summer except during a rain storm, but in winter the porch can be closed up as tightly as any room in the house.

WHEN the Fall rush of house building slows up the resourceful contractor looks for small jobs to keep him busy and enclosing porches is one item of work that is



Plan of the Porch

especially timely for November business. The housewife who has enjoyed the use of the front or side porch during the Summer finds it no longer comfortable and it is when she is missing its uses for the wise contractor to call on her and inquire if she would like to have the porch enclosed so it can be used all year instead of only in part of the year. It will not need much talking to secure a few orders for this line of work.

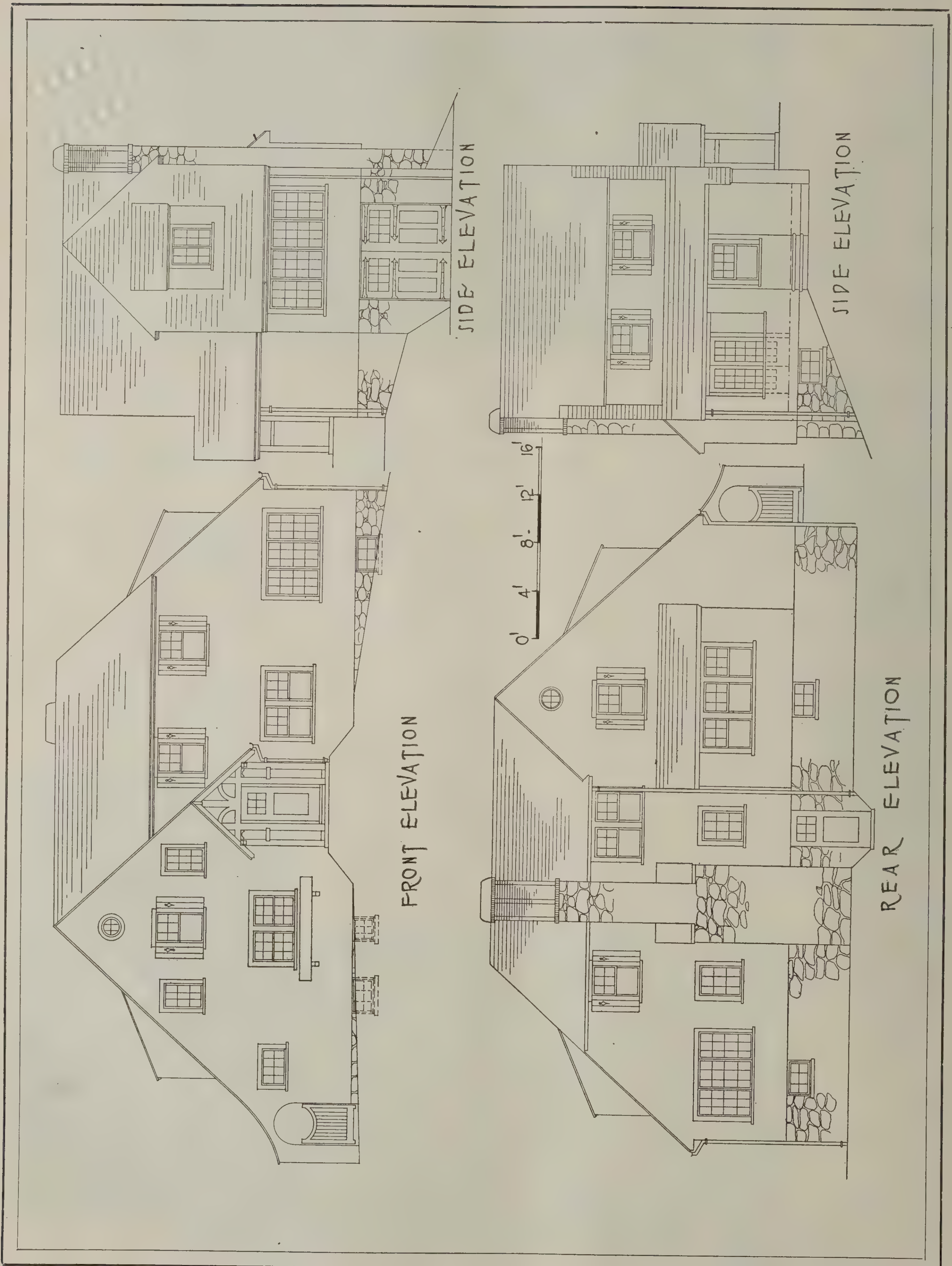
Another line of work suitable for this time of the year is weather stripping. There is plenty of work to be had, but one must do a little hunting for the orders. Take advantage of the seasons, even now plan ahead to get work that will keep you busy during the winter months; screens can be made inside; there must be some owners that want new screens—tell them you can do a better job when you are not rushed; they can give you a note payable next May when they need the screens, etc.

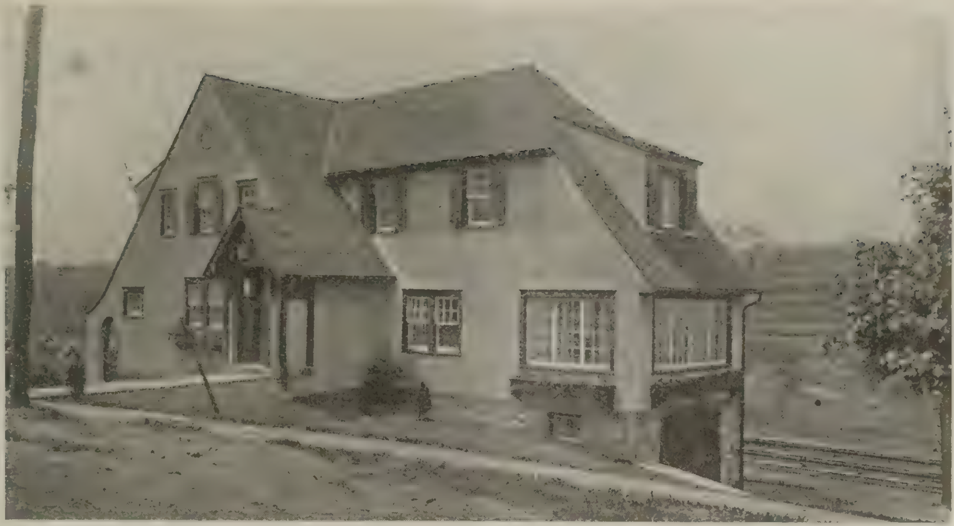
Your bank or lumber dealer will accommodate you with the cash if you need it by holding your notes as security. In this way you can turn the dull months into a really profitable time and please your customers as well.

There is no need to be idle when there are people all around us who want something we can do; it is good salesmanship to make suggestions to one's customers.

There are still many unfinished attics that can be turned into useful extra rooms by the use of wall board. Many a dining room that will look better for a beam ceiling. Divide off a large kitchen with a breakfast nook and handy cupboards, etc.

How the Porch Was


SIDE ELEVATION
SIDE ELEVATION
FRONT ELEVATION
REAR ELEVATION
0'
4'
8'
12'
16'



An Unusual Side Hill Residence

Garage in Basement Reached by Incline

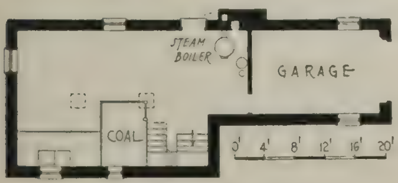
BUILDING sites that are level offer but little difficulty: Almost any design of house will be suitable, but a hill site is far different. In most cases it is a difficult matter to obtain a house that will blend with its location, and not have the appearance as if it were on stilts. Too often we see a bungalow on a hill site with a three-story basement.

The house pictured above is a very interesting example of what can be accomplished by careful study. Here the site was on the top of a hill where a wonderful view could be had, and it was this view that led to the purchase of the plot.

The architect has handled this difficult problem in a very pleasing manner. The picture was taken shortly after the house was completed, and when the shrubbery has had a few years of growth it will serve to make a very pretty picture.

This house is located at Crestwood, near Yonkers, N. Y., and Mr. C. H. Tabor, of New York, was the architect. The elevations on the opposite page show that the other side and rear are equally attractive.

The rear of the house can be seen for quite a distance, and its large stone chimney is a picturesque feature, contrasting with the stucco wall surface; a portion of the top is laid in brick, which adds a touch of color.

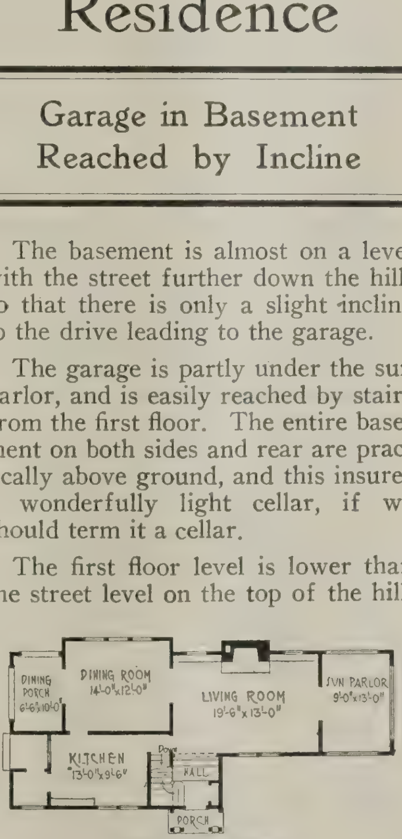


The Basement Plan

The basement is almost on a level with the street further down the hill, so that there is only a slight incline to the drive leading to the garage.

The garage is partly under the sun parlor, and is easily reached by stairs from the first floor. The entire basement on both sides and rear are practically above ground, and this insures a wonderfully light cellar, if we should term it a cellar.

The first floor level is lower than the street level on the top of the hill.


DINING PORCH 6'-6"x10'-0"
DINING ROOM 14'-0"x12'-0"
LIVING ROOM 19'-6"x13'-0"
SUN PARLOR 9'-0"x13'-0"
KITCHEN 13'-0"x9'-6"
DOWN
HALL
PORCH

First Floor Plan

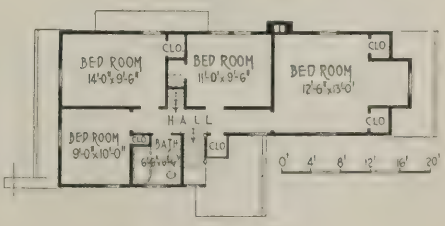
This was a clever idea, and was done to keep the height down. One enters a hall and descends three steps to the floor level. This unusual treatment gave the opportunity for a very artistic stairway, and this is the striking feature when entering the house.

The rooms are very conveniently laid out and face the rear so as to obtain the view. The kitchen is placed to the front, as is also the bathroom on the second floor.

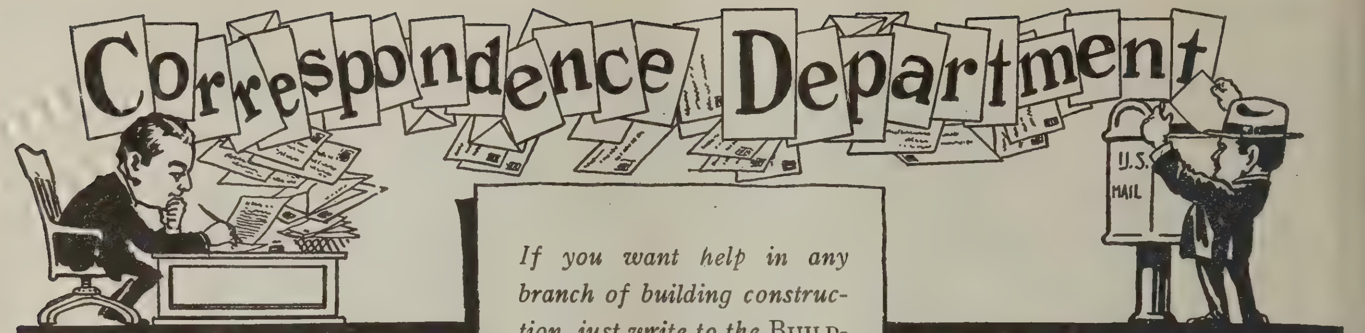
The living room is of good size, and on each side of the brick fireplace there is a large bookcase, with windows above. To the right is the sun parlor. This is glassed in during the winter, and in the summer it is screened.

Adjoining the living room is the dining room, and connected with it is the dining porch. The kitchen is reached from both dining room and hall, and has a separate entrance on the side. An enclosed entry provides space for the refrigerator. Note particularly the service door. This is simply a continuation of the roof carried down, and it makes the house appear at that end a little lower. This is also another point in making the design of the house fit the site.

The second floor has four good sized bedrooms, all connecting to a straight hall, which is rather unusual in a house of this type. There is practically no waste space whatsoever. In the principal bedroom the alcove in the dormer forms a very interesting feature, with a closet on each side under the sloping roof.



Second Floor Plan

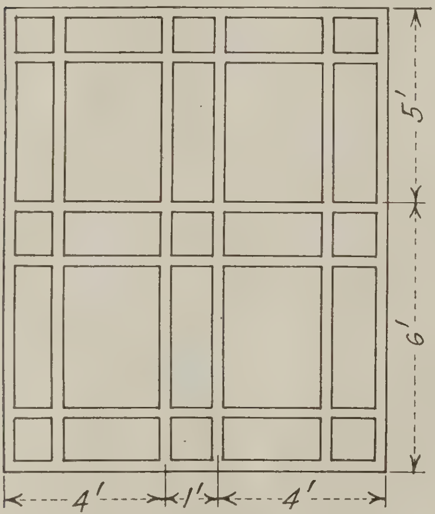


If you want help in any branch of building construction, just write to the Building Age *Correspondence Department. We will be glad to answer all your questions without charge.*

All readers are invited to discuss the questions and answers published.

Wall Board Ceiling Design

THE ordinary carpenter when he gets a job of wall board to do just slaps it up and where the joints come they are neatly and carefully covered with a finishing strip. Now not enough attention is given to obtaining pleasing effects with wall board and it is not the fault of the manufacturers but that of the workman. A little thought to the details will result in a better looking job of an evenly balanced design instead of a lop-sided affair put up in a hit or miss fashion. Of course it will in some cases use a few extra feet of wall board, but a creditable job is well worth it. To illustrate this we had a ceiling 9x11 feet to cover with wall board, and by dividing the space into panels as shown a very pleasing design was obtained. Care must be taken to get the chandelier outlet in the center. Sometimes the electrician makes a bad guess at it.—**A. L. Fairfield.**



Replacing Old Putty

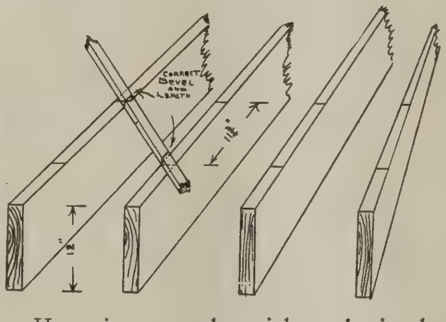
WILL you kindly advise me how to replace old putty on windows, the old putty having become cracked and loosened from the wood?—**G. R. B. Symonds.**

The best way to make a good job in a condition of this kind is to remove all the defective putty, scraping down to the wood sash bars, then paint the surfaces with a coat of white lead paint; putty applied to this will hold.

Easy Method of Marking Bridging

WHILE much has been written about the proper and improper method of cutting and fixing bridging between floor joists there sometimes crops up a problem that nothing seems to have been written about to answer what is the most practical and economical method to use.

Having seen some bridging that was cut and fixed between joists that had many unequal spacings and this took the carpenter about four times as long as it ought to if he had used a better system of finding the lengths and correct bevels.



Here is a good, quick and simple method of doing it: just mark two parallel lines the full distance along the tops of the floor joists where it is proposed to place the bridging, the distance to be ¼ inch less than the depth of the floor joists. Place the bridging lumber diagonally across the opening and inside of the parallel lines. Mark the bridging and you have the correct bevel and lengths regardless of the spacing of the joist.—**Joshua Thompson.**

Homemade Screener Saves Time

IN a Moorish tile factory, which, by the way, manufactured thousands of concrete blocks annually, there was a need for a screener which would sift the sand, and even cement, for certain kinds of work. In the cut is shown a simple screener which was made to serve the purpose. It consists of a drum, covered with screen door netting and mounted on a half inch rod, one end of which is bent to form a handle. This rod is mounted at the lower end and near the upper end on a two by four. A hopper has been built above it with an adjustable mouth at its bottom, through which the material to be sifted is run. The drum is supported over a six-bushel bin, into which the fine particles drop after passing through the screen. By simply raising the lower end of the drum all coarse material which is too large to pass through the meshes of the screen is very easily removed.

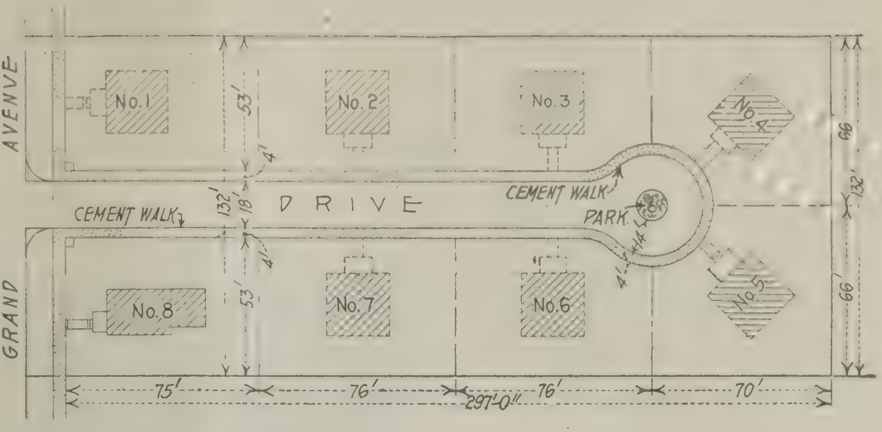
This simple device has saved much time in the factory above mentioned. Though considerable dust rises when cement is being run through, this is kept down to a large extent by throwing over the whole a blanket for covering when it is being used.

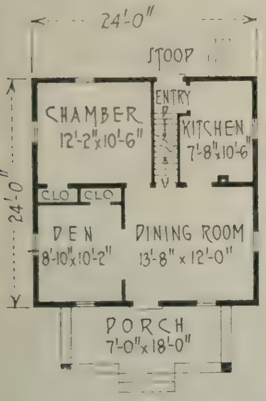
There are many occasions such as the one noted in which some sort of a screen should be employed.

Where the needs are such that it is inadvisable to expend enough money for the purchase of larger screener, the one just described will be found quite satisfactory. The construction is very simple and any carpenter can make one in a few hours.—**Dale Van Horn.**

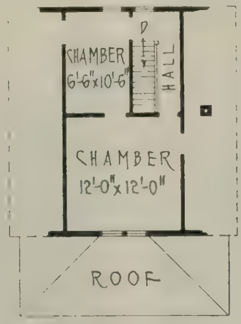
Eight Small Cottages in Group

THERE was a piece of property located close to a large manufacturing establishment with a frontage of 132 feet and it was almost 300 feet deep. It was quite a problem to utilize this abnormal shaped lot to the best advantage for the building of cottages for working men. The plan I submit here was finally decided upon, and I think it is a very novel one, very practical, and making good use of all of the lot. It provides for ample space for eight small cottages, 24 feet square, as each lot is approximately 76 by 55 feet over all.

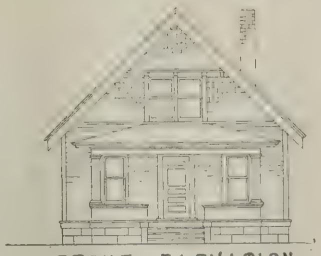




FIRST FLOOR



SECOND FLOOR



FRONT ELEVATION

The cement sidewalk and curb are all built in one piece, as shown, and the 18-foot wide driveway between the two walks with a small circular park at the end.

One of the typical cottage plans is given herewith. It is an ideal small house plan, as it gives four bedrooms in case of necessity. The upstairs rooms as a rule are not finished off, this being left for the working man to do as his circumstances permit.—**W. E. Frudden.**

N. J. Architects License

KINDLY inform me through your question box in BUILDING AGE magazine when and where I could secure an architect's license for the State of New Jersey.

I understand that one must be a licensed or registered architect in order to practice architecture in the above named State, and also that there are certain times of the year when these licenses are issued.—**H. Rothenbach.**

Full particulars can be secured by writing to the Secretary, N. J. State Board of Architects, Trenton, N. J. Examinations are held each year at stated intervals. The examination is of a practical nature and no one who has the qualified experience need fear his not passing the test on account of not being a graduate of a College of Architecture.

HAVE you ever used any machinery or device which has saved you time and money? Have you ever invented any way of doing a piece of work quicker? If you have BUILDING AGE wants your experience, and will pay regular space rate for it.

Your description should tell just how you saved time and money, either by a special way of using machinery or by short cuts in construction. Point out what methods you were using before adopting your "Time Saver" and show how your new method turns the trick. You can submit as many articles as you want.

Address The Editor, BUILDING AGE, 920 Broadway, New York City.

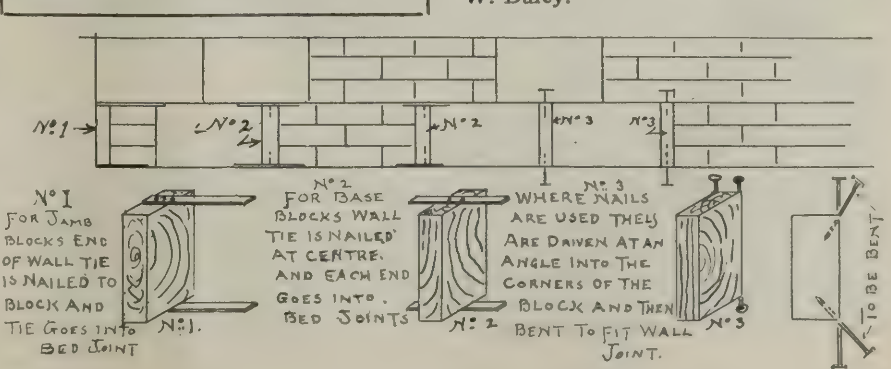
Making Sound Proof Partitions

I WOULD appreciate some information as to the proper construction of a sound proof party wall dividing a four-family frame building into two two-family, semi-detached houses.—**H. A. Hilton.**

Cinder concrete is about one of the best fills to be used; it is porous enough to have a number of dead air spaces, and this is the object to obtain. It is a usual requirement of most building codes that such a wall be brick or concrete filled. To obtain a still more sound proof job the concrete filled studs may be furred with a piece of lath and then wall boarded, lath and plastered, etc., according to finish desired. This method will leave two extra dead air spaces between the two apartments.

Securing Blocks in Masonry Walls

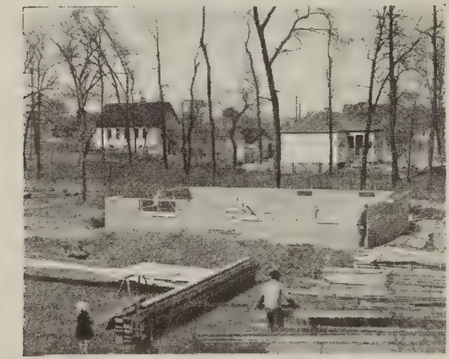
THE method illustrated herewith shows a simple, practical way of securing wood blocks in brick, tile, or concrete walls so that the finish can be securely fastened in place. It is quite simple and does the trick as well as some of the patented wall plugs.—**D. W. Daley.**

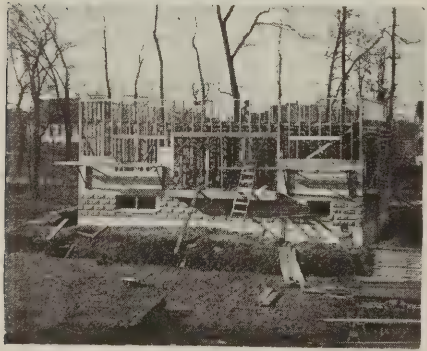

Nº 1
Nº 2
Nº 2
Nº 3
Nº 3
Nº 1 FOR JAMB BLOCKS END OF WALL TIE IS NAILED TO BLOCK AND TIE GOES INTO BED JOINT
Nº 1.
Nº 2 FOR BASE BLOCKS WALL TIE IS NAILED AT CENTRE. AND EACH END GOES INTO BED JOINTS
Nº 2
Nº 3 WHERE NAILS ARE USED THEY ARE DRIVEN AT AN ANGLE INTO THE CORNERS OF THE BLOCK AND THEN BENT TO FIT WALL JOINT.
Nº 3
TO BE BENT

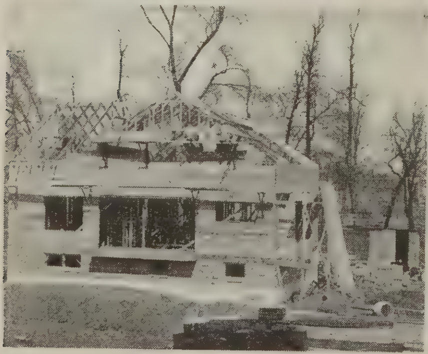
The Use of Photographs to Secure Jobs

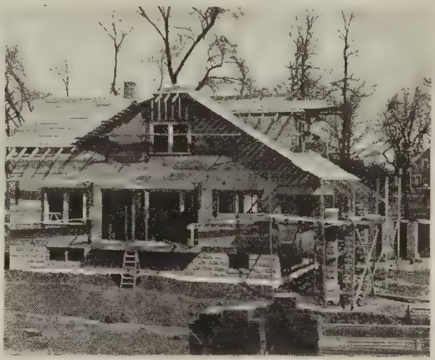
An Interesting Series of Snapshots Showing the Construction of a Small House

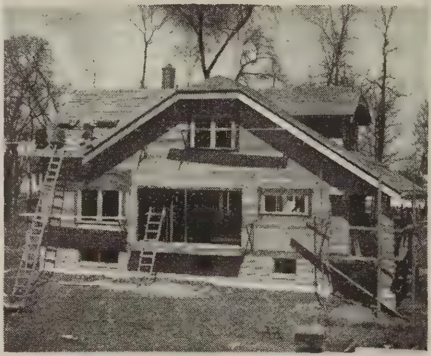
THE camera can be used as a big help to the live-building contractor. A series of pictures like those illustrated herewith show the progress of the work, each picture should have the data when it was taken and then you will have some valuable information and pictorial evidence of the time in which you can complete a house to show to some intending home builder who is anxiously asking when he can move into the house.

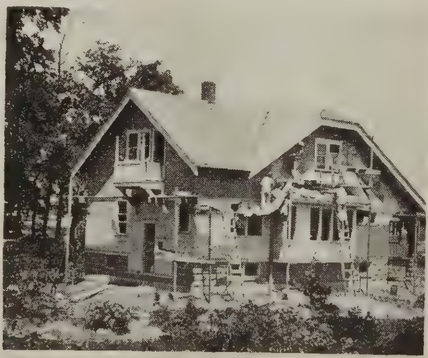

1.—The Foundation


2.—Raising the Framework


3.—Sheathing the Sides

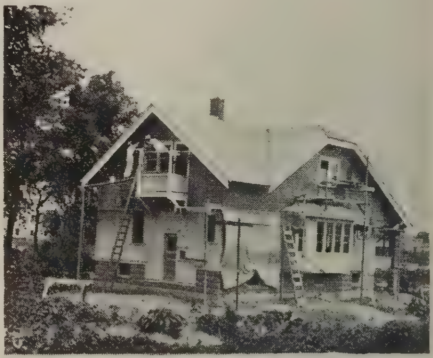

4.—Sheathing the Roof

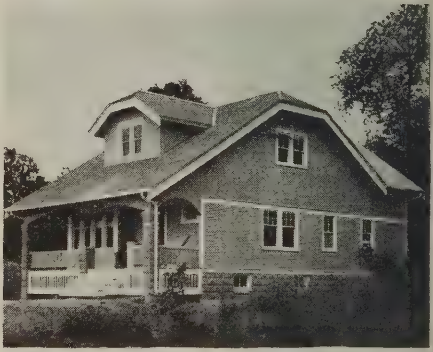

5.—Shingling the Roof

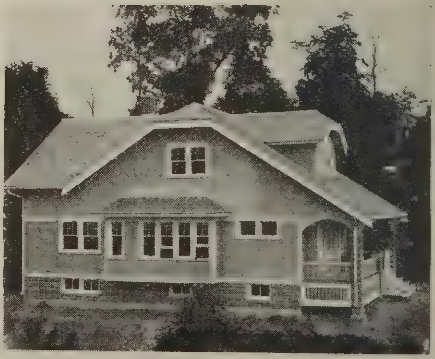

6.—Starting the Stucco

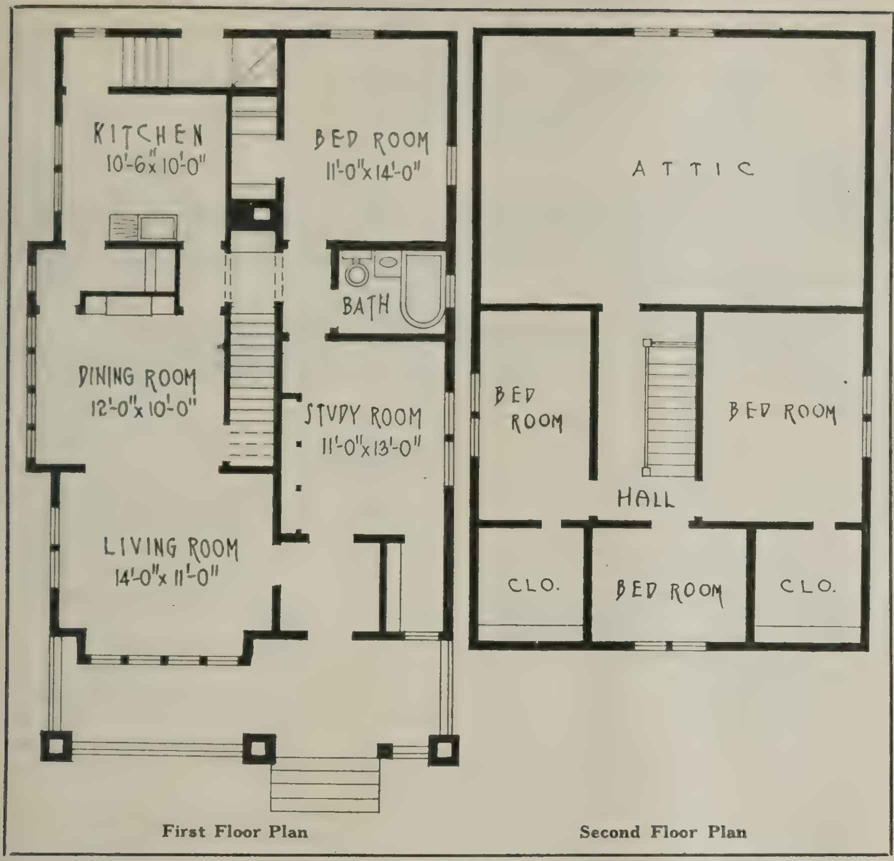
The cottage shown in this series of pictures was built as a parsonage for a Lutheran church at West Allis, Wis. The enterprising contractor on the job was Mr. W. Keibel of the same city. As will be noted from the floor plans the layout is such that it would be suitable for a doctor, dentist or other professional business man, as the office and waiting room are completely shut off from the living rooms and yet they are readily accessible. This house is 26 x 40 feet in size and was built complete for $6,500.

A series of pictures like those taken by Mr. Keibel will show the prospective owner something about the construction of a house that will be new to him, and when the contractor explains (showing picture No. 5) that to prevent the cold wind blowing around the window frames, that he uses a very heavy water-proof tar sheathing paper, he is likely to convince his pros-


7.—Finishing the Stucco


8.—The House Completed


9.—Left Side View



First Floor Plan **Second Floor Plan**

pective customer that he does good and careful work—a picture conveys information in a more convincing way than mere words. The progressive building contractor can use the camera as an aid in building up his business; pictures are convincing evidences of your ability.

On large building operations a picture every few days, or even daily, will give a history of the job. Should any question arise reference can be made to the negatives, which are titled and dated when they were exposed, and thus will show how the work stood on a certain day.

Such a record is accurate and comprehensive, and will be very valuable as evidence should any court action follow.

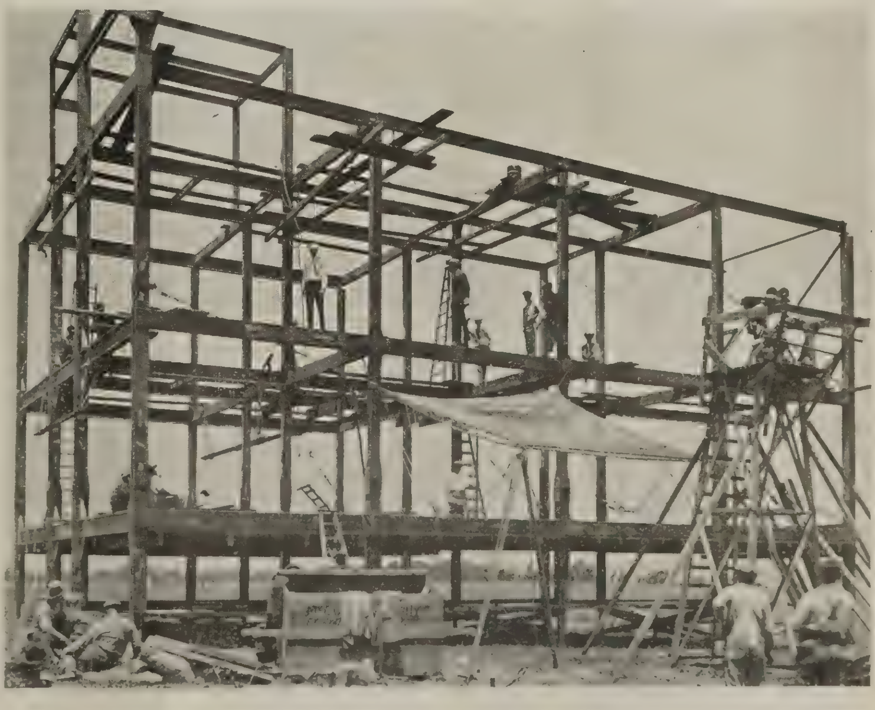
The habit of taking pictures of the work has a good effect in speeding up the mechanics — it serves to remind them that you have a record of what they are accomplishing, and it is only natural for them to strive for a good record.

Real Building in Reel Building

By JEROME LACHENBRUCH

THE photoplay flatters real life with the sincerity of its imitations. Now that the public has become picture "broke," so to speak, it is no longer satisfied with painted backdrops and palpable artifice in scenic backgrounds.

A valid method of producing an illusion may be seen in a photograph of a steel structure representing the upper floors of a skyscraper. As is evident in the photograph reproduced herewith, the "skyscraper" is a two-story framework. So, in order to carry out the illusion of height, the cinematographer photographed from a platform above the first story. Tom Moore and Darrell Foss, two Goldwyn actors, had the experience of walking the girders in a Rupert Hughes picture, "From the Ground Up." However, a net was stretched beneath the girder in case the scene did not go as planned. All this care was taken for less than a dozen shots out of a total of three hundred.



A "Thrilling Scene" on the Frame of a Skyscraper Showing How They Do It in the Movies

Legal Department

Answers to Inquiries

Architects' Right to Compensation on Postponement of Work

From G. & Co., Ark.—We were employed to remodel a bank building, and were to be paid 10% for our services. The sketches were made and approved. Afterwards the working drawings, details and specifications were furnished. We asked for a payment on account of services but were refused, with the excuse that the work had been postponed on account of high interest rates, material, etc.

We have brought suit and would appreciate any data that you can give that would be of service to our attorney.

The contract was for 10% of the total cost of work (architects' fee). We are not contractors. Clients say that they will pay fee when work is done, but will not say when they will take it up. We rendered a bill for 5% of the cost as estimated and given the client at the time the sketches were made. The contract did not state when we were to receive our fees, but it is the custom here to collect when the plans are finished. When the total fee is 10%, what would be a reasonable charge for plans, specifications, etc.? In the absence of a contract provision, when are fees due?

Answer.—We are of the opinion that you are entitled to recover the reasonable value of the services performed by you, and that this claim is enforceable now. In the absence of provision to the contrary in the agreement, it would seem that the client would have been in good position to have insisted that no part of the compensation was due you until complete performance of your contract, if the client has not suspended its construction plans. But, be that as it may, fundamental legal principles gave rise to a valid claim when the client virtually terminated the employment, by indefinitely postponing the building project. The case is governed by the following authoritatively stated rules of law:

"The measure of damages, where the architect is prevented by the employer from completing the contract, is the reasonable value of the services rendered, based on the contract price.

"Prospective profits cannot be recovered by an architect under a rescinded contract to prepare plans and obtain estimates for a building and to let the contract for the erection of such building, unless the amount agreed to be paid to him, or that anything was ever done by him toward performance of the contract, is proved." 5 Corpus Juris, 276-277.

All readers are invited to ask any questions that will help them solve any legal difficulty that they may be in. Our legal adviser will answer direct by mail and give his opinion as to the correct procedure. Questions and answers of general interest to the trade will be published in these columns. All inquiries must be accompanied by the name and address of the correspondent so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nome de plume. Remember that this service is free to subscribers. Address Legal Department, Building Age, 920 Broadway, New York City.

"If an architect prepares plans and specifications for a building pursuant to an unconditional order or direction of the owner, but without any express agreement as to compensation, he is entitled to recover the reasonable value of the services rendered whether the plans are used or not, as where the owner abandons his intention to build, or stops work on the plans before they are completed." 5 Corput Juris, 261.

"Where the contract is silent on the subject the architect will be entitled to a reasonable compensation, and in such a case the customary charges of architects for similar services, as well as other facts and circumstances of the case, may be considered in determining what is a reasonable charge." 5 Corpus Juris, 265.

Numerous appellate court decisions are cited at the pages above referred to.

As to the time when an architect's compensation is to be paid, I can perceive no reason why it should not be governed by the same general rule that applies to payment of builders' compensation. That rule is as follows:

"Where no time is specified for the payment of the compensation, it is universally recognized that the performance of the work is a prerequisite to the right to payment, unless full performance has been excused or waived." 9 Corpus Juris, 830.

One of the numerous cases cited in support of this rule is 105 Arkansas Supreme Court Reports, 580.

Full performance on the part of architect is excused by the owner's refusal to proceed with the proposed building operations. Here, again, the situation is analogous to the case where an owner refuses to permit a builder to proceed with his work.

"If the owner fails to perform the obligations assumed by him, the builder may, of course, recover the damages he may suffer from such failure, as where the builder suffers damages through delay of his work by reason of defaults on the part of the owner . . . or through the refusal of the owner or his representative to permit him to perform in accordance with the contract." 9 Corpus Juris, 734.

Neither common sense nor law accords to the owner any more right to decline to pay for services rendered by an architect before suspension of the work for an indefinite period than we would have to refuse to pay for a suit of clothes made for him by a tailor on the ground that he has temporarily determined not to procure a suit of that kind.

A reference to the citations we have given will show that there is respectable authority for saying that the architect is not only entitled to recover the fair value of work done before being stopped by the owner, but that he is also entitled to recover for pecuniary loss resulting from being deprived of the further profits that would have followed performance of the agreement.

I doubt very much, however, that the architect in this case could recover for plans, etc., furnished on the mere ground of the existence of a custom among architects in that city to be paid on plans being finished. To make this custom effective against the bank, it would be necessary, in my judgment, to show that the bank knew or ought to have known of the custom. Architects might be presumed to know of such custom because of it attaching to their profession, whereas it might not be fair to charge a bank with notice of the custom. This is merely a reversal of the proposition that a bank may be bound by a banking custom that would not be binding upon one of its architect depositors.

But, as already noted, there is no ground on which to oppose the architect's right to proceed to collect what is justly due him when the owner indefinitely postpones proceeding with building plans. Unless the owner, in employing an architect, induces the latter to agree to leave it optional with the owner to suspend or abandon the project without liability for services rendered by the architect, there is an implied understanding that the owner will carry the project on through with reasonable promptness, unaffected by unexpected difficulties in building, so that the architect may collect his due. Breach of this obligation permits the architect to treat the contract as broken—terminated by the owner's fault—and to proceed at once to collect what is coming to him.

Architects of considerable experience should be consulted for information as to what is a fair fee for partial performance of a contract calling for lump compensation for services performed and unperformed.

Recent Decisions

When Written Contracts May Be Contradicted

Long ago, Lord Coke, an English judge, declared that the "slipperiness" of memory justified the adoption of the then existing rule of law that the terms of a written and signed contract could not be contradicted by one of the parties, in the absence of a showing that through fraud or mistake the written instrument failed to express the true agreement.

The reasons for adhering to this rule are even stronger in 1921 than they were in Lord Coke's time. Men are just as prone to forget honestly or to fraudulently misrepresent their recollections as they were in Lord Coke's time. And now interested parties are competent witnesses in the trial of lawsuits where they would not have been in olden times.

So it is a mistake to assume that a builder or an owner may lightly sign agreements and as lightly avoid their effect afterwards by pleading an understanding at variance with the obligations assumed over his signature.

To illustrate, it appeared in a Utah case that a building sub-contract did not require use of materials manufactured by any particular concern, and there was no claim that the omission of such specification from the written agreement was due to fraud or mistake. Accordingly, it was decided that one of the parties could not make proof of a verbal understanding, at the time the written contract was executed or before, that materials of a particular manufacturer would be furnished by the sub-contractor. The Utah Supreme Court aptly said that "written contracts are to be regarded with some gravity, and the presumption is indulged that all prior and contemporaneous conversations and understandings are merged and embodied with them."

"A contract for buildings or other works stands upon the same plane as any other contract and must be held to express the entire agreement of the parties. It cannot be varied, added to, modified, or contradicted by parol or extrinsic evidence, or by any showing of the intentions of the parties, or of their real agreement with reference to the subject matter. Nor where the clear legal effect of the contract is to include the doing of certain work can it be shown by parol evidence that such work was not included. But the intention of the parties to the contract may be shown where its language is not sufficiently specific, or, it has been held, where certain incidents are omitted." (22 Corpus Juris, 1108-1109.)

The general rule under consideration, however, does not preclude a showing that a written contract was *modified* by a verbal agreement reached after execution of the written instrument, excepting in those rare instances where the whole agreement might be required by law to be reduced to writing.

Instancing application of the general rule, the New York Supreme Court once decided that a written contract to lay an "asbestos-granite" floor could not be modified by the owner setting up a claimed verbal understanding, concurrent with execution of the written agreement, that the contractor would polish the floor and warrant the permanency of colors in it. The court said:

"The writing appears, upon inspection, to be a complete contract containing all the particulars necessary to make a perfect agreement, designed to express the whole agreement between the parties, which excludes it from the operation of the rule permitting parol evidence consistent with and not contradictory of the written instrument, where the contract rests partly in writing and partly in parol."

The St. Louis Court of Appeals held that a contractor who agreed to do certain excavating according to fixed specifications was not entitled to show that, in the negotiations leading up to the contract, it was orally understood that some of the requirements of the specifications were to be overlooked.

And, showing that the rule works both ways, the United States Circuit Court of Appeals, Eighth Circuit, decided that an owner of a building could not assert a verbal agreement for a larger quantity of work than was called for by the written contract between him and the contractor.

In a California case, the District Court of Appeal adjudged that where a building contract clearly identified the plans and specifications intended to be made a part of the agreement, it could not be shown that there was an oral understanding that another set should be used.

The same court held that where a written agreement called for a roof to be constructed of "No. 2 Mission Tile," the owner could not assert a concurrent verbal agreement that the tile should be of a particular shade of red, and that the material would be replaced by the builder should the owner be dissatisfied with the color of the tile used.

In Massachusetts, the Supreme Judicial Court declared that where a builder was not bound under his written contract to paper a house, the owner could not rely upon an asserted oral understanding that he might deduct from the agreed price of the building $50 to cover the cost of papering it.

What is Good and Workmanlike Manner

Speaking of the legal meaning of provision in a contract requiring a builder to make repairs in a "good" and workmanlike manner," the Alabama Supreme Court said in a recent case (88 So. 871):

"The words 'good and workmanlike manner' as used in this and other contracts in this jurisdiction, for the discharge of the particular service, mean that the same shall be done as a person skilled in that business should do it—in a manner generally considered skillful by those capable of judging such work in the community of the performance."

But, after all, the inclusion of these familiar words in building contracts adds nothing to what would otherwise be implied. By repeated decisions of the appellate courts of the country, it has been declared that a professional builder's contract to erect a structure carries with it a presumed obligation undertaken by him to perform the work in a proper and workmanlike manner. And a New York decision (155 N. Y. S. 333) shows that the same general principle applies to the performance of cost-plus contracts. In the cited case the court said:

"When a person contracts with a corporation with a reputation for the successful completion of large enterprises to do a work at cost and a percentage, he has the right to expect the same skill and ability to be applied to his work that it would give to a work where its profit was dependent upon its ability to do the work at a cost less than the contract price."

The builder's implied obligations have thus been summed up by a legal authority, who cites ample judicial declarations to support the statements as sound law:

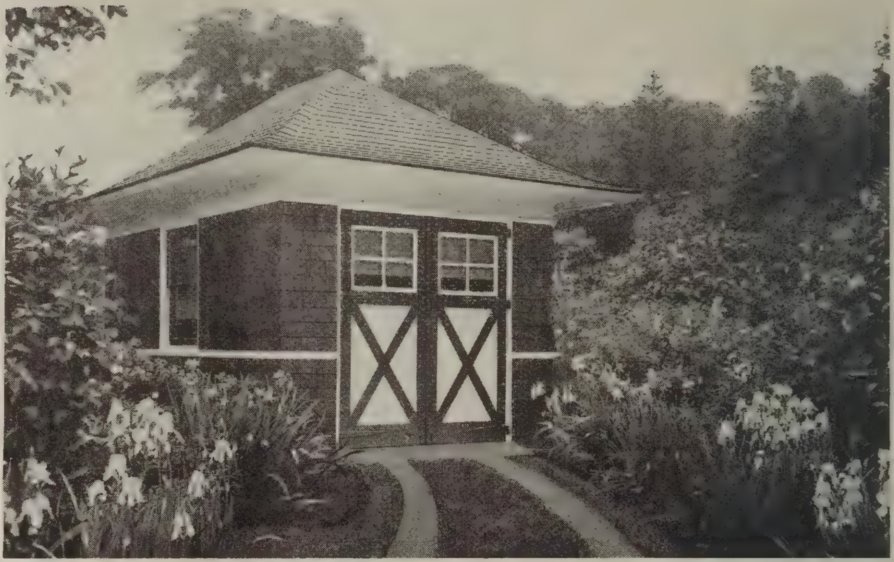
"It is the duty of the builder to perform his work in a proper and workmanlike manner; that is, the work should be done as a skilled workman would do it, the law exacting from a builder ordinary care and skill only. It does not mean such workmanship as would be expected from an artist or specialist in that particular line.

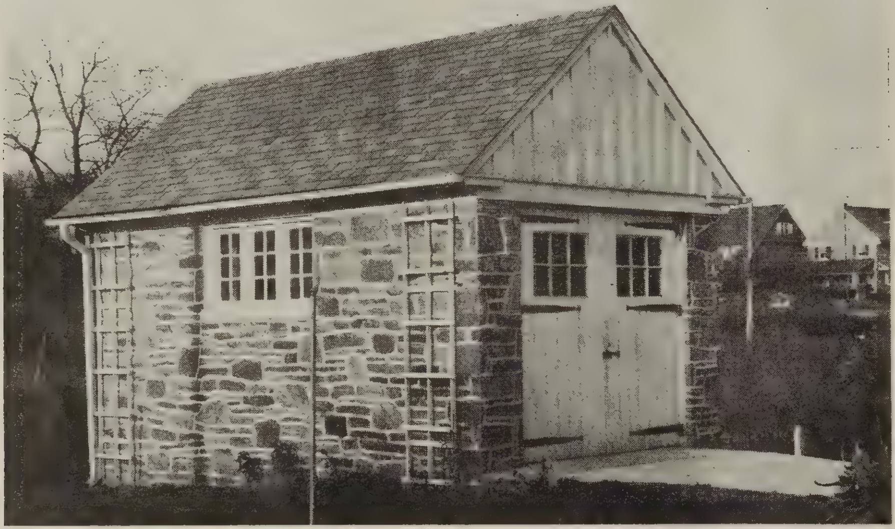
A Page of Garages

WOOD

STONE

BRICK

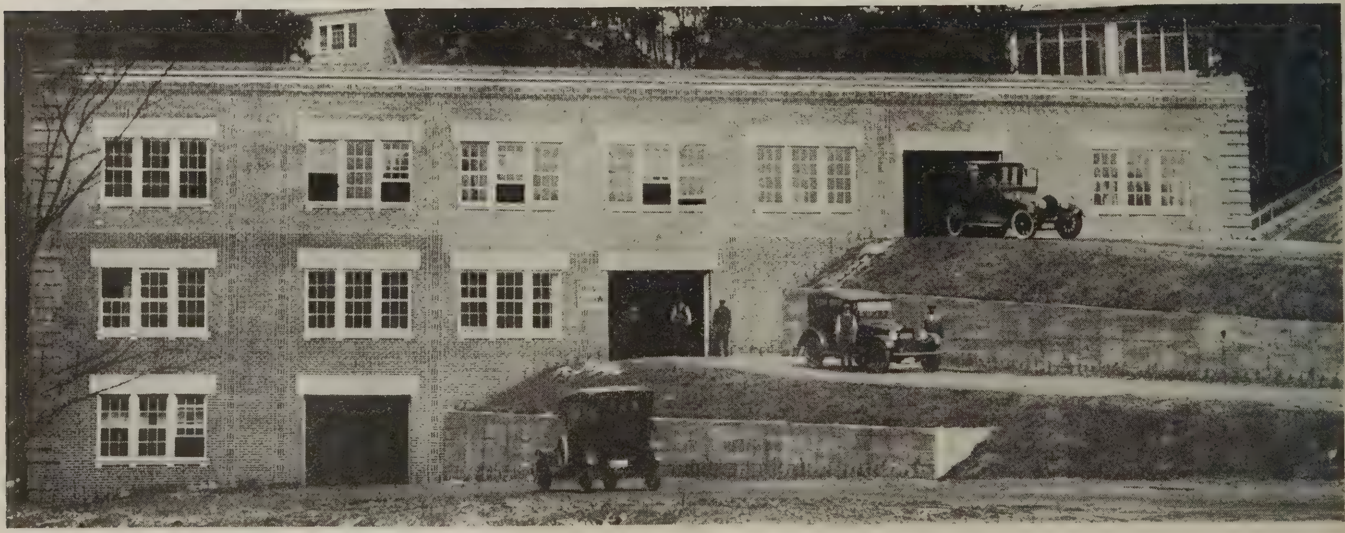




A Small Shingled Garage at Oak Lane, Pa.
C. E. Schemmerhorn, Architect
Philadelphia, Pa.

A Small Stone Garage at Bala, Pa.
J. N. Platt, Architect
Philadelphia, Pa.

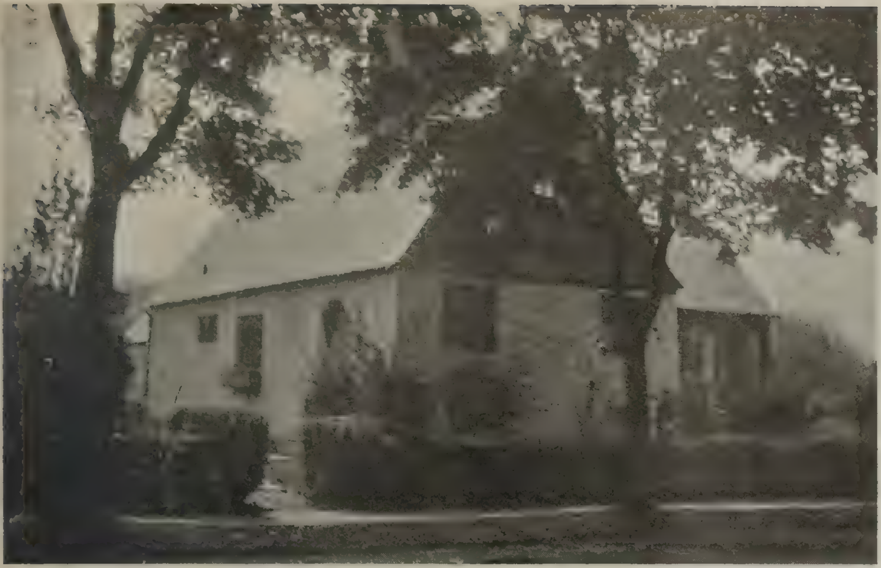
A Unique Brick Public Garage at Washington, D. C.
Harry Wardman, Builder

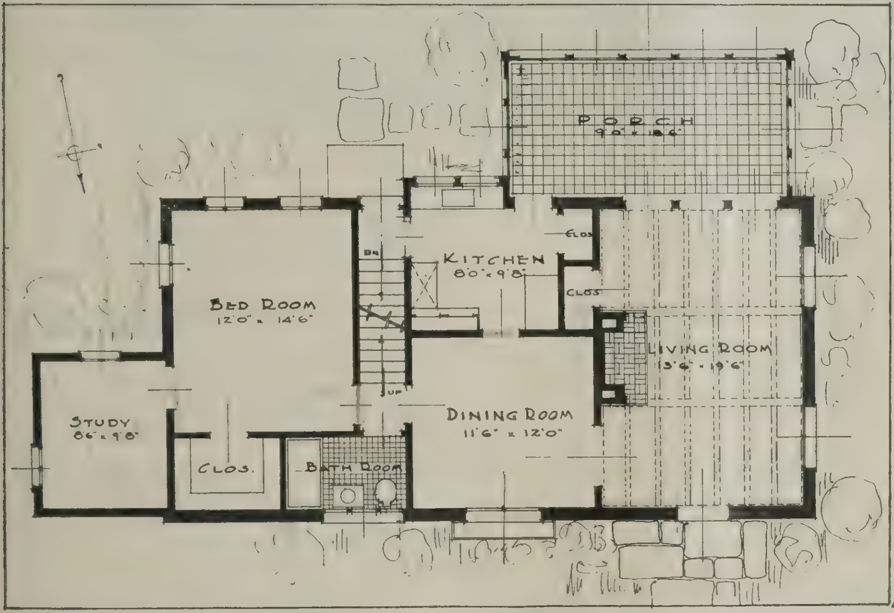


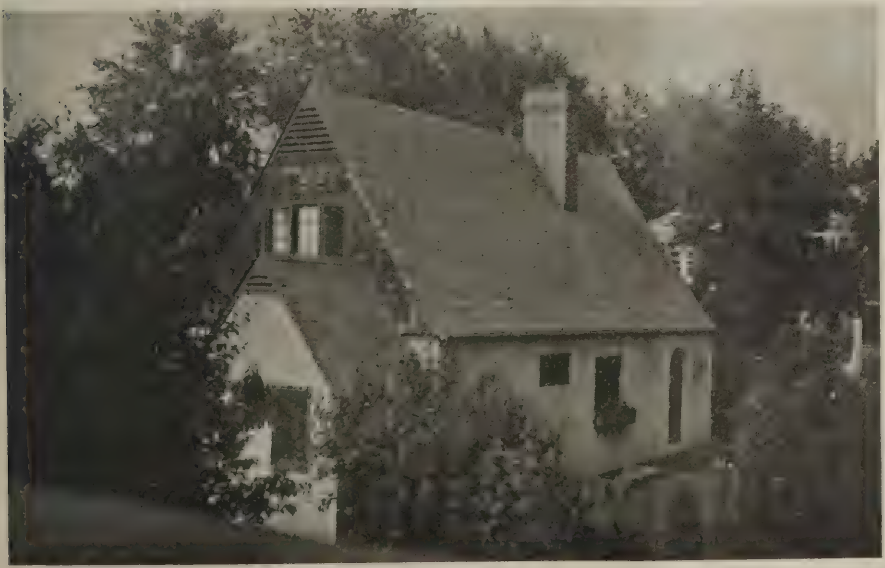
The Wardman Park Inn, of Washington, D. C., Boasts of a Brick Garage with Three Entrances, Doing Away with the Need of Elevators, Access Being Gained by Three Graded Approaches

An Architect's Own Home

George C. Buchtenkirk
Architect







THE architect's business is to plan homes for people of various tastes, and all sorts of designs are the natural result. When he builds a home of his own it is usually far different from what his clients would imagine. Most folks think that an architect would have a real ornate house, but the opposite is usually the case. Good taste can be displayed in simple designs.

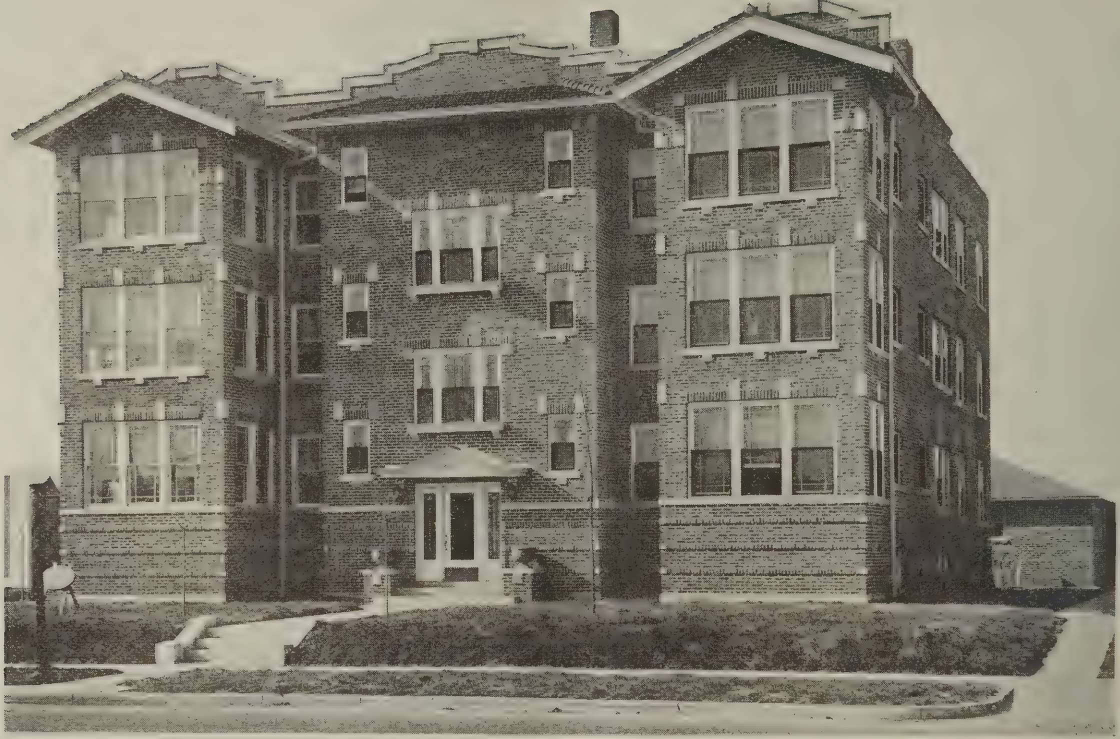
Mr. Buchtenkirk, in planning his own country house at Sea Cliff, Long Island, N. Y., has somewhat followed the design of the homes of the pioneer settlers of Long Island; and at first glance one would think it one of the old houses.

The top picture shows the front of the house and the bottom picture the rear. The entrance is on the side of the house, and is shown in both pictures.

The principal rooms are all on one floor, bungalow style, with two additional bedrooms in the attic.

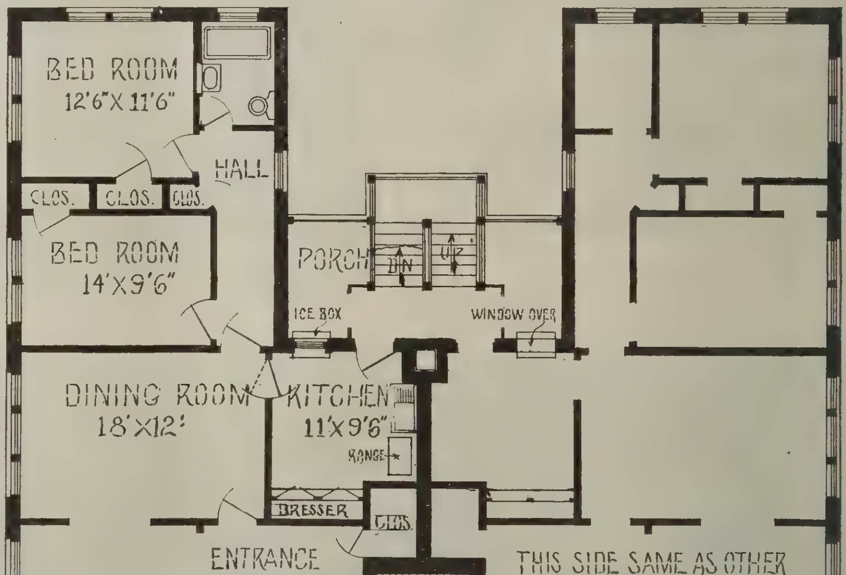
The living room is a fair-sized room, being 13 ft. 6 in. by 19 ft. 6 in. in size. Opposite the entrance are a series of three French windows, which opens up the entire side of the living room to the porch. The ceiling is beamed in a pleasing pattern, as shown by the dotted lines. The large open fire-place is placed in the center of the rear wall. Note particularly that, to obtain privacy, the two front windows have been placed rather high.

The dining room is practically a square room, and a swinging door connects it with the kitchen. A range is placed in one corner with the flue leading to the chimney, and a dresser is on the opposite side.



Modern Six Family Apartment House

CHARLES EDGAR BATES
Architect



THERE is a growing demand in the smaller cities for apartments, many families prefering the "easy housekeeping" advantages they offer.

The six-family apartment illustrated is located on North Meridian Boulevard, Indianapolis, Ind., and was built by the E. G. Spink Co., of that city. Several houses of the same design have been built, and there is always a waiting list for any vacant apartments, this attesting the popularity of the design.

As the building is 62 feet front and rear and 65 feet deep it will need at least a 75-foot lot to give the necessary light and air. A larger lot would be better.

There are many features in the layout of this apartment house that are interesting. Ice is placed directly in the built-in refrigerators from the rear porch. In the basement is located a well equipped laundry, with set tubs, washing machine, drier, ironing machine, etc., for the use of all the tenants in common.

The front bedroom can be used as a library, being equipped with an in-a-door bed. It has a small bathroom attached. This makes it an ideal guest room.

Design of Reinforced Concrete Beams

By **EDWARD F. HAMMEL**, Architect and Engineer

PERHAPS no single material so readily adapts itself to as many uses, and is used so generally in building construction of all types, as concrete. Whether the structure be frame, brick and wood joist, or fireproof, there is somewhere a place in which concrete can be used to better advantage than any other material.

The average builder is therefore quite familiar with concrete. Mixing stone, gravel or cinders with sand and cement in the proper proportions, presents no serious difficulty to him, and neither indeed should it, since we find the use of concrete quite common, even in Roman times. But of latter years, this material, hitherto used exclusively to resist compressive stresses, has been combined with steel to form a more complex structural element, commonly called reinforced concrete.

In the initial stages of the development of this new form of construction, it was not possible to compute with any but the most approximate degree of accuracy, the strength of this combination of two well known materials. Theories as to their probable action, when thus combined, were promulgated and their results checked up with actual tests. Corrected formulas were worked out and again revised.

However, while even at present the design of reinforced concrete construction is not an exact science, yet with its more general introduction into building work, a further analysis of stresses induced, compared with much test data, furnished that degree of confidence in the developed theory of reinforced concrete, which today enables one to compute the strength of any element of reinforced concrete construction with a reasonable feeling of assurance in the accuracy of such computations. However, due to the very complex nature of the construction, the method of computation is also necessarily complex. For this reason, there has arisen a new branch of engineering, specializing in reinforced concrete design and construction. Often to the uninitiated, the design of such work seems somewhat shrouded in mystery.

It is not possible in a few brief articles to teach all the phases of reinforced concrete design, neither indeed will any such object be attempted. What the writer will endeavor to accomplish, and he hopes successfully, will be to set forth certain comparatively simple rules for computing the more elementary problems in reinforced concrete design, which may from time to time arise in the average practice of the builder. When more complicated problems arise, it is best to take no chances, but to consult an engineer experienced in this class of work.

Design of Reinforced Concrete Beams

Concrete itself is essentially a material adapted to resist compressive stresses. In tension it has very little value. For this reason in calculations its resistance to tensile stresses is entirely discounted, that is, no allowance at all made for it. While this is not strictly correct, the error is on the side of safety. What actually occurs when a reinforced concrete beam is gradually loaded, is that the concrete above the neutral axis is in compression, and that below it in tension, the same as with a timber or steel beam. At first the reinforcing steel is practically unstressed. As the loading increases, a point is reached at which the concrete on the extreme underside of the beam is no longer able to resist the tension, and very fine cracks develop. At the same time, due to the bond or grip between the concrete and steel reinforcement, the tension is automatically picked up by the steel, and the beam will resist failure until either the concrete above the neutral axis is stressed, in compression, beyond its power of resistance, or the steel reinforcement at the bottom of the beam is stressed beyond the elastic limit.

It will thus at once be seen that to economically design a reinforced concrete beam, the steel must be so proportioned that both steel and concrete will reach their ultimate resistance simultaneously. We also might note that such a beam will have two moments of resistance, one for the concrete (Mc) and one for the steel (Ms), and that when these are equal, the design is an economical one.

Before proceeding with an actual problem, it will be necessary to assign safe working stresses to both steel and concrete, and for the purpose of this and succeeding articles, the following values, approved by most authorities on the subject, will be used.

Extreme fibre stress on concrete in compression . . . . 650 lbs. per sq. in.
Tensile stress in steel reinforcement . . . . 16,000 lbs. per sq, in.

As in the design of any beam, it is first necessary to determine the bending moment caused by the external forces (the load to be supported) which must be resisted by the resisting moment of the beam. After determining the bending moment, we must then design a beam having a resisting moment equal to or greater than the bending moment.

For simple beams, that is those not restrained at the ends, and supporting a uniformly distributed load, the formula is

(1) $M = \frac{W\,L}{8}$; in which

M = The bending moment in inch pounds.
W = Total load in pounds to be supported, including the weight of the beam itself.
L = Span of beam in inches, measured from center to center of bearings.

For the purpose of illustration, consider the following problem:

A school building of fireproof construction has floors supported by beams spaced 6 ft. apart and having a span of 18 ft. What is the bending moment?

The dead load, or weight of the floor construction itself will be taken at 60 lbs. per sq. ft. and the live load, due to occupancy, at 75 lbs. per sq. ft., thus the total load will be 135 lbs. per sq. ft. Each beam must support a floor area of 6 x 18 = 108 sq. ft. and a total load of 108 x 135 = 14,580 lbs. uniformly distributed. Thus $W = 14{,}580$; $L = 18 \times 12 = 216$ ins. Substituting in formula (1) we have:

$$M = \frac{14{,}580 \times 216}{8} = 393{,}660 \text{ in. lbs.}$$

The resisting moment of the beam must equal this figure.

In order to avoid complex formula, various values, needed in determining the resisting moments of reinforced concrete beams, have been worked out and are given in the accompanying table.

In this table

p = the percentage of steel reinforcement, which is the ratio of the steel area to the total cross sectional area of the beam. Referring to Fig. 1:

$$p = \frac{\text{area of steel}}{bd}$$

x = a factor used in determining the location of the neutral axis.

j = a factor used in determining the arm of the force couple.

Rc and Rs are factors in determining the resisting moments of the beam, as limited by the concrete and steel respectively.

Figure 1 shows a cross section of a reinforced concrete beam, the diagram to the right showing the stress variation. It will be noted from an examination of Fig. 1 that

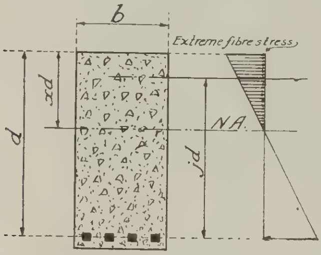


FIG. 1.

b = width of beam in inches.

d = depth of beam in inches from top to center of reinforcing steel.

N. A. = neutral axis, above which the concrete is in compression. Its location varies depending on the percentage of steel reinforcement used.

xd = Distance of neutral axis from top of beam.

jd = Distance from center of gravity of concrete stress to center of steel, and is the arm of the force couple

$$jd = d - \frac{xd}{3}$$

The formulas for determining the resisting moments of a reinforced concrete beam are:

(2) $Mc = Rc\ bd^2$ as determined by the concrete.

(3) $Ms = Rs\ bd^2$ as determined by the steel.

An inspection of columns 4 and 5 of Table 1, giving values of Rc and Rs, shows that an economical design will require a percentage of steel reinforcement of .0077, since when p = .0077, the values of Rc and Rs are practically equal. For any other value of p, the beam will either have the concrete element or the steel element the stronger.

TABLE I $\frac{E_s}{E_c} = 15$

FOR DESIGN OF REINFORCED CONCRETE BEAMS

Concrete at 650#/□". Steel at 16000#/□".

p	x	j	Rc	Rs
.001	.158	.95	49	15.2
.0015	.20	.93	61	27.3
.002	.22	.93	66	29.8
.0025	.24	.92	72	36.8
.003	.26	.91	77	43.6
.0035	.28	.91	83	50.8
.004	.29	.90	85	57.6
.0045	.31	.90	91	64.8
.005	.32	.89	92	71.2
.0055	.33	.89	95	78.2
.006	.34	.89	98	85.3
.0065	.35	.88	100	91.5
.007	.365	.88	104	98.5
.0075	.375	.875	107	105
.0077	.378	.874	107.5	108
.008	.38	.87	108	111.3
.0085	.39	.87	110	118.2
.009	.40	87	113	125
.0095	.41	.86	114	130.7
.0100	.42	.86	118	137.7
.0105	.42	.86	118	144.7
.011	.43	.86	120	151
.0115	.44	.85	121.5	156
.012	.45	.85	124	163
.0125	.45	.85	124	170
.013	.46	.85	127	177
.014	.47	.84	128	188
.015	.48	.84	131	202
.016	.49	.84	133.5	215
.017	.50	.83	135	226
.018	.51	.83	137	239
.019	.52	.83	141	252
.02	.53	.82	141	263

It so happens that when this percentage of reinforcement is used, in connection with the stresses previously given, the formula $M = Rc\ bd^2$ becomes essentially the same as that used for the design of wood beams, namely, $M = \frac{bd^2}{6} \times s$, where s is the safe unit stress.

In the first case, if we substitute the value of Rc given in Table 1, we have $M = 107.5\ bd^2$; while if in the common formula we substitute 650 for s, which is the concrete unit stress used, we have $M = \frac{bd^2}{6} \times 650 = 108\ bd^2$.

Therefore if without tables or other data, it is well to remember the formula $M = \frac{bd^2}{6} \times s$, and use the value of 650 for s. Then steel having an area equal to ¾ of one per cent. of the sectional area of the beam must be used. This gives an approximate and easily remembered rule, no more difficult of application than for wood beam computations.

In the example before us Mc or Ms must not be less than 393,660.

Taking the value for an economical design, we have $Mc = 107.5\ bd^2$. We must now assign values to either b or d and solve. Let us select a beam 12 in. wide. We then have Mc = 393,660; b = 12. Substituting in formula 2, we have $393,660 = 107.5 \times 12 \times d^2$. Solving for d^2 we have $d^2 = \frac{393,660}{107.5 \times 12} = 305.1$;

$d = \sqrt{305.1} = 17.46$, say 17½ ins.

The cross sectional area is 12 x 17.46 = 209.5 and the area of steel reinforcement must be .0077 x 209.5 = 1.61 sq. ins.

Four ⅝ in. sq. rods have a total area of 1.56 sq. ins., which, while a trifle under, will be close enough to be safe.

Fig. 2 shows the size of beam and spacing of rods. For fire protection there should be from 1 in. to 1½ ins. of concrete below the steel reinforcement.

Table II will be found helpful in selecting the sizes of steel reinforcement. Square rods are generally used.

TABLE II.

AREAS OF SQUARE AND ROUND BARS

Size Ins.	Area, Sq. Ins. Square	 Round
1/16	.0039	.0031
⅛	.0156	.0123
3/16	.0352	.0276
¼	.0625	.0491
5/16	.0977	.0767
⅜	.1406	.1105
7/16	.1914	.1503
½	.2500	.1963
9/16	.3164	.2485
⅝	.3906	.3068
11/16	.4727	.3712
¾	.5625	.4418
13/16	.6602	.5185
⅞	.7656	.6013
15/16	.8789	.6903
1	1.0000	.7854
1 1/16	1.1289	.8866
1⅛	1.2656	.9940
1 3/16	1.4102	1.1075
1¼	1.5625	1.2272
1 5/16	1.7227	1.3530
1⅜	1.8906	1.4849
1 7/16	2.0664	1.6230
1½	2.2500	1.7671
1 9/16	2.4414	1.9175
1⅝	2.6406	2.0739
1 11/16	2.8477	2.2365
1¾	3.0625	2.4053
1 13/16	3.2852	2.5802
1⅞	3.5156	2.7612
1 15/16	3.7539	2.9483
2	4.0000	3.1416

Due to physical limitations, it is not always possible to use the most economical section. Very often the depth of a girder is limited, and often its width also.

For instance, let us assume that in a certain proposed building the story heights will be 14 ft. (finished floor to finished floor) and that the maximum depth of girders is 26 ins.

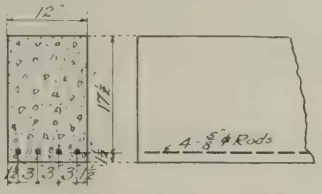


FIG 2.

These girders have a span of 24 ft. and must also be as narrow as possible. Each girder must support a load of 50,000 lbs. uniformly distributed.

Here W=50,000, L=24x12=288 in.

Substituting in formula 1, we have

$$M = \frac{50{,}000 \times 288}{8} = 1{,}800{,}000 \text{ in lbs.}$$

In formula (2) Mc = 1,800,000; d X = 24 (2" being deducted from the maximum depth of 26" to allow for fire protection) and $d^2 = 576$.

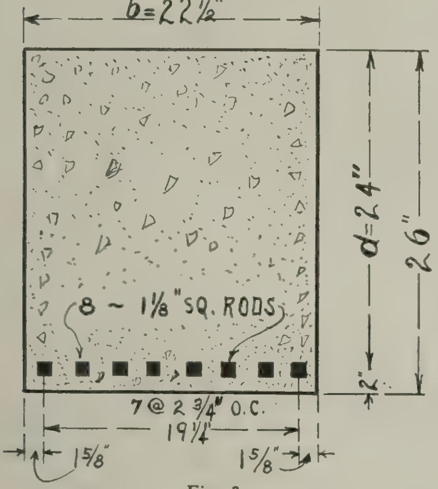


Fig. 3

Since we are after the minimum section, we must choose the highest practicable value of Rc, which according to Table 1 is 141 and requires a steel percentage of .019.

Substituting in formula 2, we have

$$1{,}800{,}000 = 141 \times b \times 576.$$

Solving for b, we have

$$b = \frac{1{,}800{,}000}{141 \times 576} = 22\tfrac{1}{2}''.$$

The girder will therefore be 22½" x 24" = 540 sq. ins.

The area of steel required is .019 x 540 = 10¼ sq. ins.

8 — 1⅛" square rods have an area of 10⅛ sq. ins. which is satisfactory. The section is shown in Fig. 3.

Had the most economical percentage of steel reinforcements been used, keeping the same depth but not limiting the width, we would have had a girder 24" deep by 29⅛" wide, reinforced with 5.38 sq. ins. of steel, a slight increase in the amount of concrete used, but a decided saving in steel.

The next article will deal with Tee beams.

Making It Safe to Build

A Few Practical Remarks on Checking Up Costs

By **NOBLE FOSTER HOGGSON**

President, Hoggson Brothers, New York.

OBVIOUSLY the purchasing department of a building concern exists primarily for the purpose of buying the materials required in a building operation. This is the *raison d'être* of such a department. Yet only a portion of its time is spent in actual buying. The intelligent purchase of building materials requires a most careful investigation prior to each purchase. It is essential that any building organization study markets and materials in all sections of the country in order to buy advantageously.

It is true in the building business, as in any other business, that lowest prices are quoted to the largest buyer and to those having the highest credit. But even with the advantage this gives to even the largest building organizations a constant study of the current and probably future trend of prices and the development of markets is essential.

There are numerous ways to gather the necessary data and various means of keeping an index finger on the national situation. One of the readiest means of approach is through the actual building operations if the concern be national in its scope.

These operations are scattered over the country and the personnel of the building concern which has been assigned to the various jobs afford local representatives in all important sections. In the aggregate they represent outposts of the home office placed throughout the country. They can be called upon at any time for special information regarding their section and are continually sending in regular reports which can be sifted for information applicable to all operations.

In the placing of sub-contracts there is a steadily increasing source of information. For a list of all subcontractors who have served the building organization can be easily kept on file. This list can be consulted in connection with a bid of any size. For although the policy of the national building organization is, and rightly so, to utilize sub-contractors in the locality of the building operation, there is always the chance that some other source of supply might result in a saving for the owner.

A great deal of the time of the purchasing department's personnel is devoted to consultation with subcontractors who have submitted favorable bids—for the *specifications* must be the basis of all contracts and not the bidder's interpretation or misinterpretation of them. Then, too, no bidder can be allowed to secure a contract who is going to be unfair to himself in his price, for this means disappointing work.

Taken all in all the work of the purchaser of supplies, materials and equipment for a big building or even a small one is of vital importance to the financial success of any building operation.

ELEVEN million persons, either as workers or as members of workers' families, are estimated to derive their living from construction, either directly or through manufacturing and mining products used in the construction industry. The support given to agriculture and to trade by the annual expenditures of this great number of persons is estimated at more than $5,000,000,000 for rent, fuel, food, clothing, furnishings, recreation, etc.

Simple Dignified Hollow Tile House

Designed by
R. C. HUNTER & BRO.
Architects

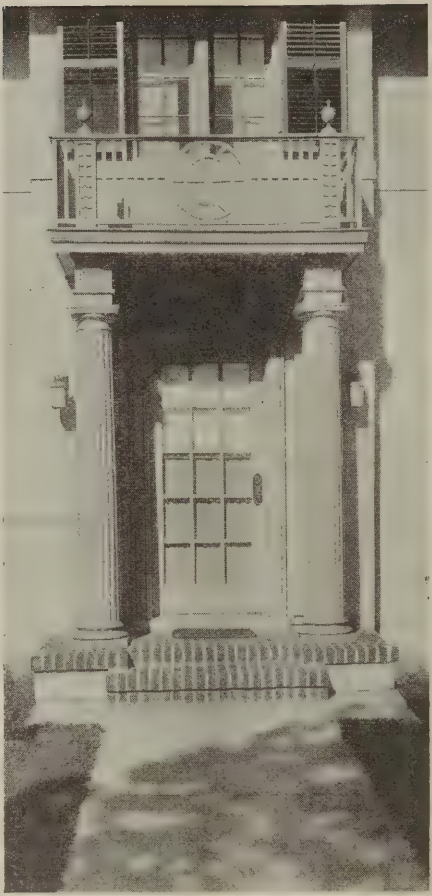
FOR the closely built suburbs this house has many atractions. It is substantial in design and in construction, with compact, convenient and economical plans. It is a house that will require but few repairs in the years to come.

The walls are finished in a light cream-colored stucco on hollow tile. This construction of the walls gives good insulation against heat and cold and saves fuel in the winter. It is fireproof and does not absorb moisture, and forms a most satisfactory backing for the stucco and plaster. Unlike a brick wall, furring is not required on the inside as a protection against moisture, a dampproofing coat applied to the wall before plastering gives absolute protection against any dampness with the block construction.

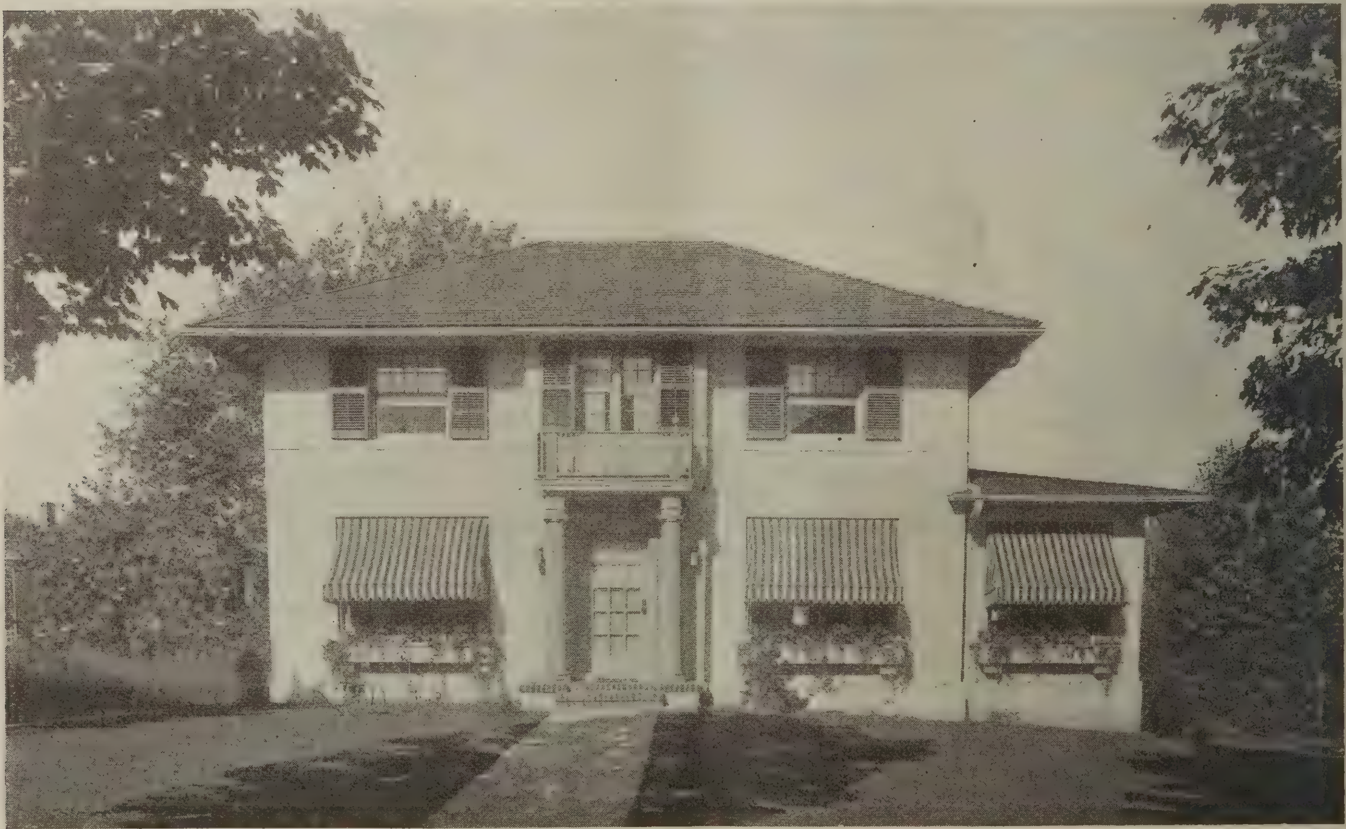
The plain, unbroken roof offers no lodgment for snow or ice, no catch pockets for water, thus avoiding all roof troubles.

An economical feature of the plan is the utilization of the space under the living porch as a garage. A shallow ramp leads down to the level of the cellar floor, making access easy. The garage has water, heat and light at practically no cost for installation, as they are connected directly to the house systems in the cellar. The tile-finished concrete floor of the living porch gives a fireproof ceiling to the garage, while the foundation wall of the house gives a fireproof wall between the garage and the cellar. Thus the fire hazard is entirely eliminated, while the car is made most convenient of access. A fire door is provided in the wall between the garage and the cellar so that one can reach the car without going outside, a distinct advantage in inclement weather.

The living porch is all that the name implies—tile floor and base, plenty of large windows, screened and provided with awnings, flower boxes and the like—a delightful place to live in the summer, and it will be appreciated



Detail of Doorway

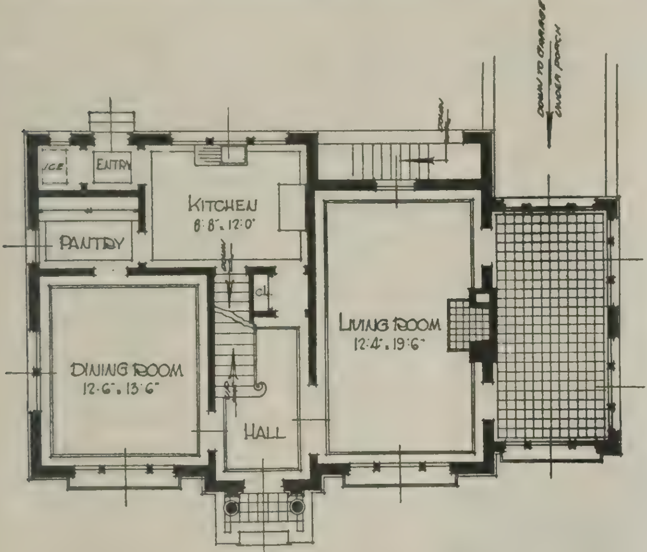


House of Mr. G. R. Steinert, Hackensack, N. J.

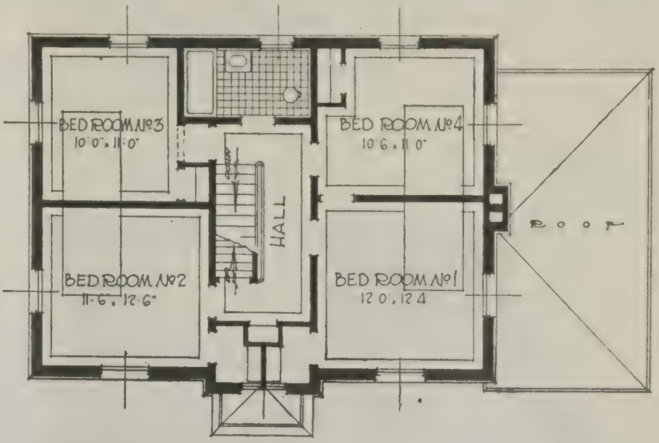
in the winter, when it is glassed in and heated.

The service portion is compact and is convenient to the main rooms. The four bedrooms on the second floor are all of good size and all have cross ventilation. A generous bathroom and plenty of closet space are provided.

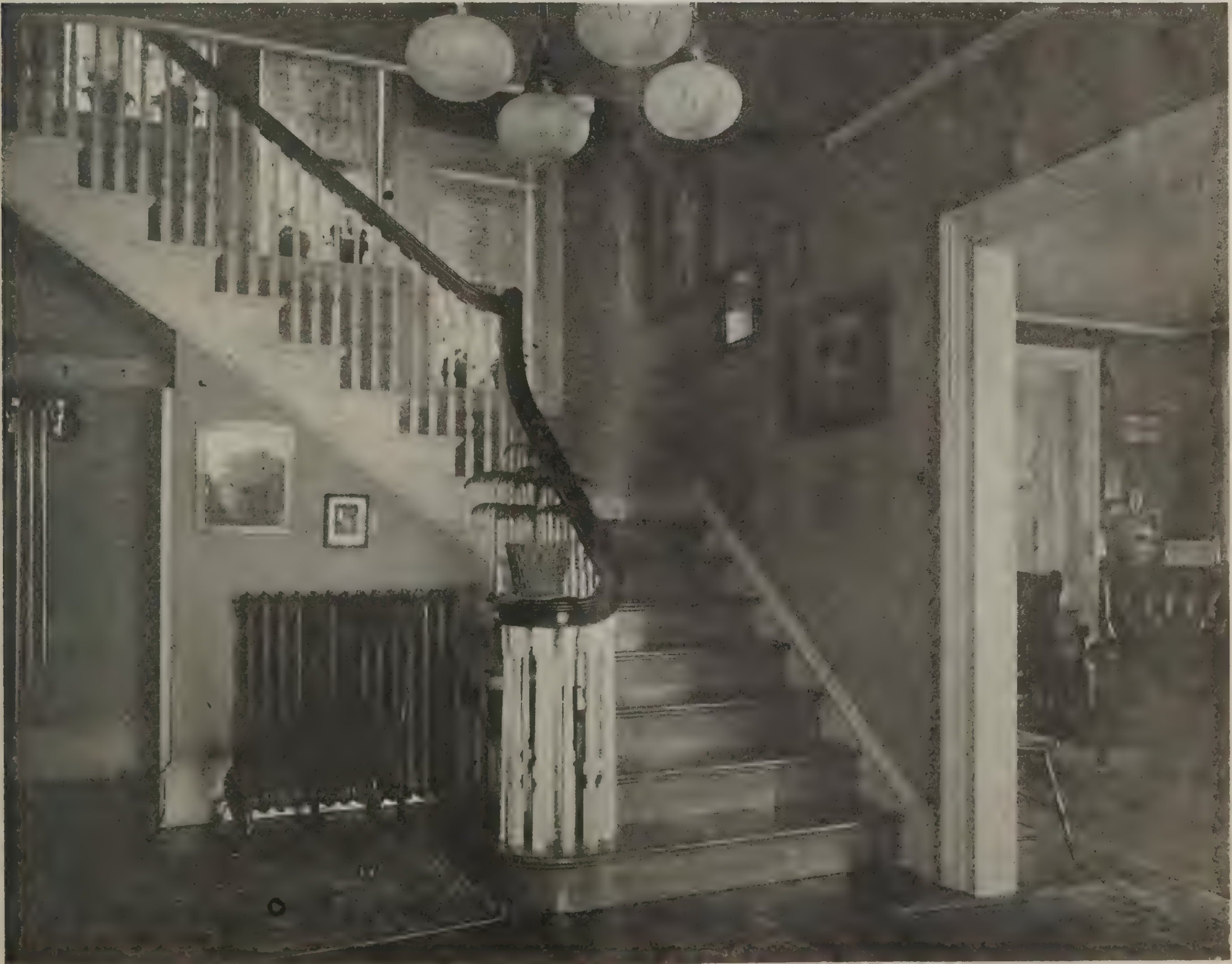
The entrance of the house is worthy of note. It gives just the required dignity for a house that sets close to the street and the bold detail offers a pleasing contrast with the plain stucco walls.



First Floor Plan



Second Floor Plan



Stairway Designed by C. E. Schermmerhorn, Architect, Philadelphia, Pa.

Magnesite Stucco

Simple Practical Instructions for Its Successful Application

MAGNESITE stucco is entirely different from the ordinary stucco, and therefore should not be confused with same.

Prior to the war, magnesite was imported principally from Greece to this country for plastic purposes, and when the World War broke out, the supply was cut off and it became necessary for manufacturers to seek a new source of supply. Large deposits of magnesite were found in California and the State of Washington; and hundreds of thousands of dollars were invested in developing mines to get out what was known as caustic magnesite for the plastic trade. In six years, the industry grew from nothing, so to speak, until today the production of magnesite runs into thousands of tons. All caustic or plastic magnesite produced in this country comes from the State of California.

After the magnesite is mined it is calcined or roasted. Then it is ground to a fineness where 75 per cent. will pass through a 200 mesh to the square inch sieve and 95 per cent. or better through a 100 mesh sieve. It is in this condition that the magnesite is received by the plastic stucco manufacturers and composition floor manufacturers.

At first considerable difficulty was experienced in the calcination of magnesite, due to the fact that it was found that to obtain the best results, the heat in the calcination furnaces should be controlled.

Stucco on Bungalow with Chipped Slate Composition Shingle Roof

Several months ago, a large company in California established a heat-controlled magnesite which assures uniformity in quality of material and the performance of the material.

When this magnesite is received by the stucco manufacturer it is intermixed with various ingredients and shipped in the dry form to the job.

Some manufacturers introduce fillers such as wood fibre, sawdust, ground cork, hair and other ingredients, claiming that by the introduction of these ingredients, a larger spreading capacity in yards to the ton of material is obtained, which unquestionably is true.

Other manufacturers maintain that the fillers used by them are all mineral and that by using all mineral fillers, there is no possibility of rotting or deterioration taking place in the composition itself.

Magnesite stucco is not mixed with water, but is mixed with a solution

Stucco on Large House with Tile Roof

of magnesium chloride. Generally speaking, this magnesium chloride is shipped in what is known as the fused or flake form. Water is added at destination to dissolve this chemical to bring it to the proper strength prescribed by the manufacturer.

The claims for magnesite stucco, compared with ordinary stuccoes, are many. It is stated authentically that it is water-proof, fire-proof, immune to expansion and contraction; that its strength is from three to five times greater than ordinary stucco; that it will not crack under ordinary settling strains; that it binds to window casings and door frames, setting up in a dense rock-like mass, and is flexible.

The secret of successful application of magnesite stucco is to see to it that the backing over which the plastic material is to be applied is prepared properly, and most manufacturers issue specifications offering suggestions as to the best way to prepare various backings. To be successful, the material is applied in two coats, commonly known as the base and finish coat.

Great care should be exercised in seeing to it that the solution of magnesium chloride registers between 22 degrees and 24 degress Beaumé, for the reason that when you bring this solution of magnesium chloride in contact with the powdered products and mix same into a mortar, a chemical reaction takes place, forming what is known as oxy-chloride cement, and if the solution of magnesium chloride is too weak in strength, you immediately produce a material which will not have the tensile breaking strength, nor will you derive the full benefits of the material as there will be a possibility of the plastic material setting up in a more or less chalkified manner.

Backings should be nailed, preferably with galvanized or zinc-coated nails, and the corners and angles of the building reinforced with heavy, quarter inch mesh, galvanized wire cloth for a distance of at least 3″ each way from the angle or corner. Precaution should be taken to see to it that the water table is slightly bevelled, so that the water will not work in behind the stucco.

Stucco, Cobble Stones and Wood with Asbestos Shingles

Stucco with Ornamental Wood Trim, with Metal Shingles

Care should be used in the application of the base coat material by first seeing to it that the surface over which the material is to be applied is free from moisture or frost. Then the surface should be well wet with the solution of mixing compound and thoroughly wet at the time of the application of the base coat, the object of this being to prevent the suction of the backing from the plaster itself, for the reason that if this suction is not killed it will draw the magnesium chloride from the plastic material and prevent a complete chemical reaction in the plastic material itself. If the surfaces were damp or wet, it would reduce the strength of the magnesium chloride in the plastic material and prevent bonding.

After the base coat has been applied, the surface should be well roughened and prepared to receive the finish coat. The base coat should be permitted to set up well before applying the finish coat. The surface of the base coat should be well wet down with the solution of magnesium chloride and wet at the time the finish coat is applied. Each coat should be at least ¼″ thick and the total thickness should be at least ½″ in order to insure satisfactory results.

Just as soon as the finsh coat is applied, and while it is still fresh, marble and granite chips can be cast into the finish coat which produces a very beautiful finish; also various colored stones can be used to obtain almost any color effect desired to harmonize with the roof and the color scheme of the cornices, door casings, window frames, etc.

Precaution should be taken in seeing to it that the stucco is not brought down any lower than 10″ to 12″ above the grade line.

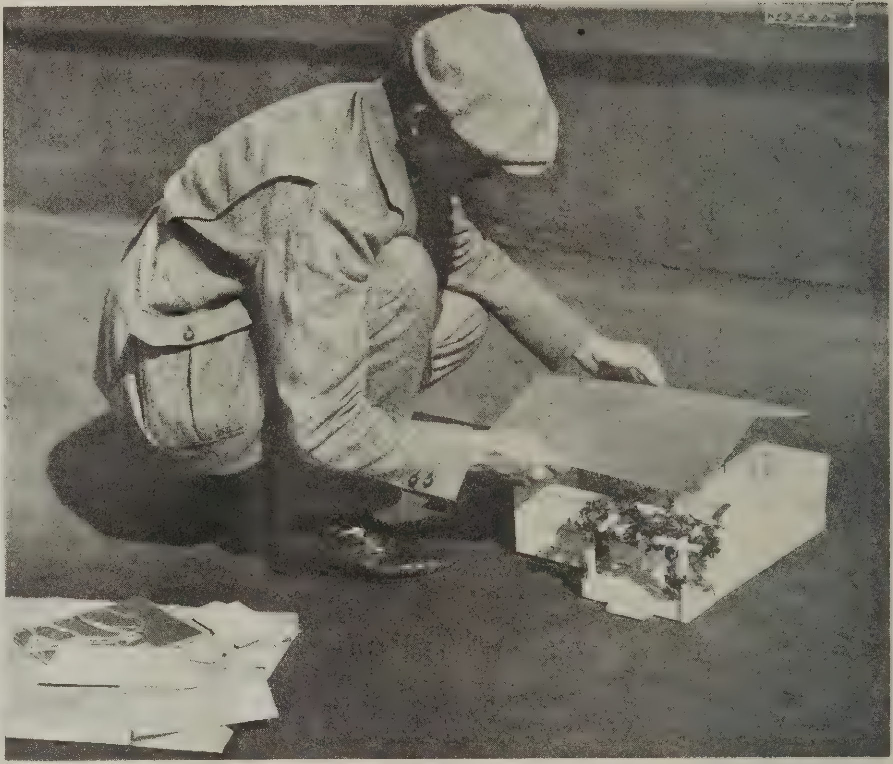
By following these simple instructions a user of magnesite stucco can be assured of obtaining the utmost satisfaction from the use of a magnesite stucco.

You must understand that one of the greatest advantages of using a magnesite stucco is that it can be used equally as successfully in winter or freezing weather as in the summer, the only difference being that it takes a little longer for the material to set up hard. Ordinary stuccoes are mixed with water and should a sudden atmospheric change take place, it would be susceptible to freezing. The solution of magnesium chloride used to mix magnesite stuccoes will not freeze. Therefore, it makes no difference how cold it should get after applying the material, no fear need be entertained as to the results because of the fact that it will not freeze.

In selecting a magnesite stucco care should be used on the part of the purchaser to see to it that he selects a material manufactured and produced by a responsible organization who has had experience in the production of this material and who can give the highest quality material. Most people contemplating building are in favor of stucco but they hesitate for the reason that they have seen so many failures in stucco. Magnesite stucco has eliminated this fear.

The Use of Models To Secure Business

Easily Made of Paper, Watercolors, Wood and Glued Together



Putting on the Roof of a Model of Bungalow

MANY people who want to build a home can get but little information looking at a blue print and the builder is at a loss to explain how the house is going to look. The lady usually says, "Well, I don't know—perhaps I won't like it when it is up—maybe I had better wait until I see something I like already built." In a case like this the builder who is able to say, "I will show you just how the house is going to look—I will make a model of it from the plans and show it to you in a few days" is the one that will land the contract.

Now a model is not so hard to make—the four elevations can be copied from the plans on heavy paper colored with water colors and then folded and glued together—the roof being put on top—chimneys, dormers, etc., are cut out separately and glued in place. Porch columns, pergolas, projecting rafters, etc., can be easily whittled out of soft wood and glued in place. All can be colored or stained with colored ink or water colors.

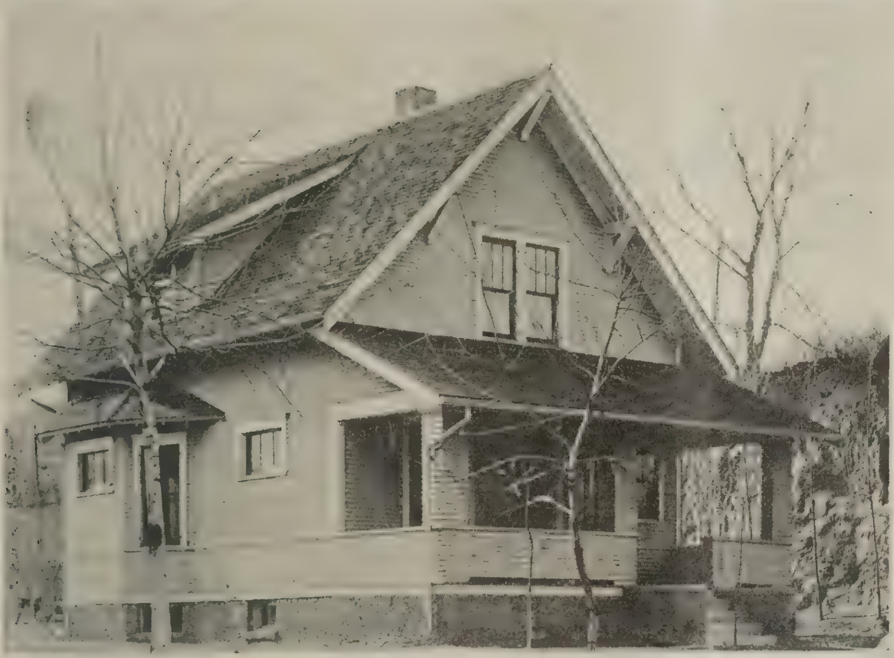
This sounds like kindergarten work, but it makes quite a number of people realize exactly how the house will look. To be able to furnish a model will be quite a help in securing a contract from a customer who is doubtful about the outcome; to show such a customer a model wins their confidence and that is worth while obtaining. For large buildings the service of a professional model maker can be obtained, but this expense is not warranted for the usual small building; a small model made out of stiff paper will answer. In the illustration we show one of these small models, in this one even the interior portions have been put in place, of course the paper here is drawn and colored up on both sides.

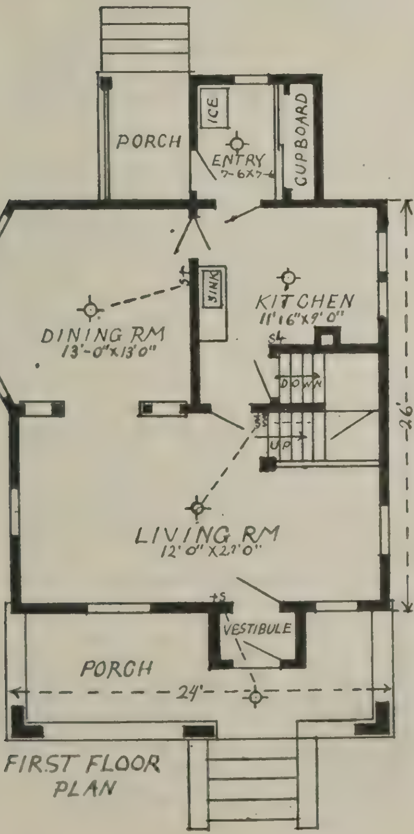
Here is a little suggestion of how builders can help themselves get more business.

Practical Short Method of Estimating

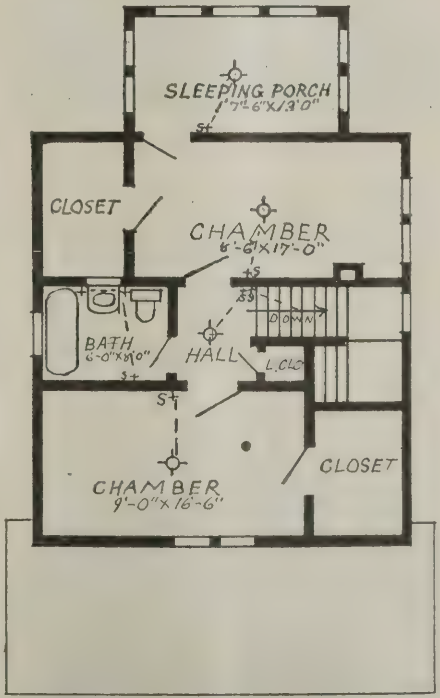
Suggestions on Figuring the Cost of a Small Cottage

By I. P. HICKS





FIRST FLOOR PLAN



SECOND FLOOR PLAN

WE WILL now give another plan and estimate by our short method of estimating. We advise carpenters and contractors who figure on jobs to make a record of their jobs figured by the method as here given. A few jobs figured in this way will make a price guide that should prove a valuable aid to the estimator. Estimates made in this way will give the contractor a source of information that he can depend upon and it is easily figured. All that is necessary is to figure out a price for one, one and one-half and two story buildings of the different classes. It is obvious that the same rate cannot apply to all buildings.

Classify Each Building

The thing to do is to classify the buildings and make a rate for each class. If contractors will spend a little time and do this in a careful manner then they will soon have something that will be much to their advantage in making estimates. Do not make the rates by guess, but figure it out from the actual costs on the work that you have done and from actual experience. No system will be of any benefit to the one who will always figure by guess. A guess is more likely to lose than to win no matter what method you try. Try our method in fair and honest way and you will be sure to profit by it.

Figuring the Mason Work

Excavating, 122 yards, 75c.	$91.50
Concrete footings, 120 cubic feet, 40c.	48.00
Hollow tile building blocks, 1,900 5x8x12, laid in wall per 100, $11	209.00
Chimney, 33 lin. ft., 8x12 flue, per ft., $1.50	49.50
Chimney cap	2.00
Cementing cellar bottom, 560 sq. ft. 12c.	67.20
Cement steps, 4 7"x15"x5'-6", $4	16.00
oping, 2 pieces, 4"x14"x6", $3.60	7.20
Stucco Plastering on foundation 20 yds., $1.40	28.00
Total excavating, foundation and chimney	$518.40

Figuring the Front Porch

2 squares, 2x8 porch floor, framing with ⅞x3¼ face clear fir porch floor, $24.	$48.00
2 squares, 2x4 porch ceiling, framing with ⅝x3¼ face clear fir ceiling, $13.	26.00
3 squares, 2x4 porch roof, framing with sheathing and shingles, $19.	57.00
2 squares, rail and column framing with siding, $16	32.00
48 lin. ft. porch cornice, 85c.	40.80
Total cost of porch above foundation	$203.80

The actual square feet of floor space is 192 square feet, which makes the porch figure approximately $1.06 per square foot, above the foundation. The gutter and painting is not figured in the above estimate.

Estimate of Main Building Above the Foundation

7¼ squares 2x8 first floor framing, with No. 2 1x8 shiplap rough floor and ⅞x2¼ face clear plain red oak finish floor, $47	$340.75
7½ squares 2x8 second floor framing, with No. 2 1x8 shiplap rough floor and ⅞x2¼ face clear yellow pine finish floor, $42	315.00
7½ squares 2x4 ceiling framing, $5.50.	41.25
20 squares 2x4 outside wall framing and No. 2 1x8 shiplap sheathing, $13.	260.00
20 squares siding, $9.50	190.00
19¼ squares 2x4 roof framing, sheathing and shingling, $22	423.50
136 lin. ft. outside base, 20c	27.20
84 lin. ft. corner boards, 15c	12.60
190 lin. ft. main cornice, 75c	135.00
86 lin. ft. dormer cornice, 70c	60.20
16 lin. ft. baywindow cornice, 60c	9.60
48 lin. ft. porch cornice, 80c	38.40
3 gable brackets. $2.00	6.00
1½ squares 2x6 partitions, $9	13.50
11½ squares 2x4 partitions, $7	80.50
4 cellar steps to grade landing, $2	8.00
8 steps grade landing to cellar, $1.25	10.00
13 steps, stairs to second floor, $4	52.00
Landing	10.00
5 cellar window frames. $5	25.00
4 single window frames finished in oak, $18	72.00
3 sash frames in oak, $13	39.00
3 single window frames finished in pine, $14	42.00
3 twin frames finished in pine, $28	84.00
1 triple frame finished in pine	42.00
1 outside door frame and door, oak finish	47.00
1 vestibule door frame and door, oak finish	46.00
1 mirror door frame and door, oak finish	50.00
2 main door frames and doors, oak finish, $26	52.00
11 main door frames and doors, pine finish, $18	198.00
1 colonnade opening, oak finish	70.00
130 lin. ft. oak base, 25c	32.50
300 lin. ft. pine base, 15c	45.00
100 lin. ft. oak picture molding, 12c	12.00
150 lin. ft. pine picture molding, 10c	15.00
Cupboard	35.00
Linen closet	15.00
Medicine cabinet	12.00
Closet shelves	4.00
Total	$2,971.00
Plastering, 604 yards, 75c	453.00
Total	$3,424.00

So far we find the cost to be $3,424. The actual square feet of floor space of both stories, including the small rear porch is 1,522 feet, which makes the cost approximately $2.25 per square foot.

For a short cut in estimating we could figure as follows on a similar job:

Short-Cut Estimate

Excavating, foundation and masonry	$518.40
192 sq. ft. front porch, $1.06	203.52
1,522 sq. ft. of first and second floors, $2.25	3,424.50
Plumbing	450.00
Electric wiring	90.00
Painting	200.00
Gutter and tin work	42.00
Heating, furnace	300.00
Incidentals 5% of the above	261.42
Total estimate	$5,489.84

Chimneys Attractive

By FELIX J. KOCH

ONE of these days, when you're planning the new home, keep a weather-eye out for the chimney.

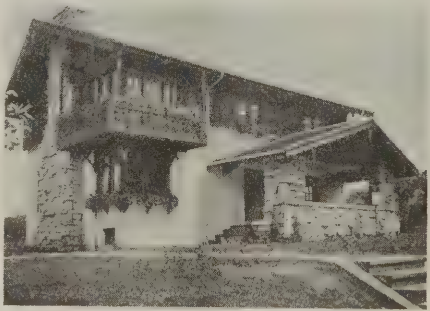
In the past ten years, or so, somehow, it must be admitted, concern for the chimney, as regards its artistic value, had become very nearly a lost architectural art.

Houses had chimneys rising from their roofs because, . . . well, because one had to have a chimney in order to insure a proper draught; and so a chimney out of brick, or whatsoever else might suffice, was planted very, very often, quite out of sight from the house-front.

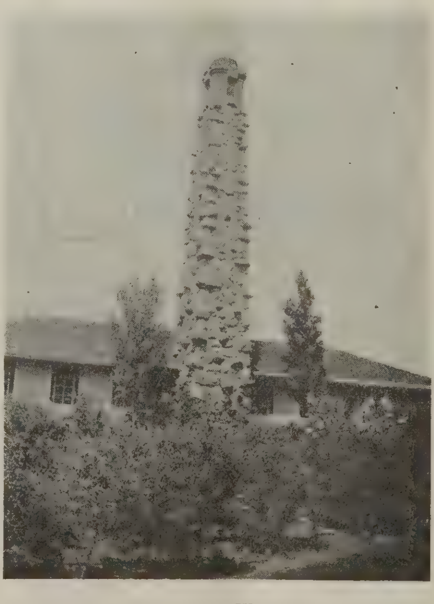
That there could be actual beauty in chimneys;—that even the age-old log-cabin of the forebears derived much of its charm from its chimneys—seems to have been completely overlooked!

Now, however, architects and builders are awakening to the fact that the chimney can be made a thing of decided beauty;—in fact, that it could be made a factor for giving a decided tinge of the unique to the home!

Builders in Dayton, Ohio, the city beautiful of the American Mid-West, especially, is giving considerable attention of late to chimneys; raising these largely of the native stone.



Artistic Outside Chimney



More Chimney Than House

Pictures, of course, tell the story far better than words might; both where the chimney serves to adorn the simpler, two-story shingle bungalow, and, again ,where attached to the more elaborate stuccoed home.

Out of the ordinary, however, in that connection, is the third concept of some well-to-do Daytonians:

These folk rest content with a bungalow of just a single story;—oblong, and with the roofs sloping to each of the four facades. Rising from the earth itself at rear of the one long-side, however, there is a gigantic chimney of the rough-cut stone;—this almost as high as the house is long.

Though seldom done, all chimneys should be capped either with a natural stone slab or a concrete cap made on the spot. This keeps out the rain and insures a good draft.

If the top is not capped with a solid slab it will be well to cover it with concrete, leaving a hole of the flue size. This holds the bricks or stones in place and prevents possible dislodging of one or more in later years, when the mortar has a tendency to disintegrate. Besides this it will add to the attractiveness of the building.

What the Editor Thinks

Building Publicity

THERE is no business today that is receiving so much publicity as the building business. This is to the benefit of every building contractor, the more that is said helps to create the desire to own a home. It is hardly possible in these days of high rents to pick up any paper that does not have something to say about building.

The subject is being talked about everywhere—it is a real, live subject and the builder will cash in handsomely on this publicity for many years to come. People want homes—their own homes.

There are many people living in city apartments who should live in the suburbs and they would rather do it, but they do not know how to overcome the financial end. Builders will be able to secure many more contracts if they are able to secure the needed financial help for the prospective home owner. It is worth while for the builder to give this matter careful consideration and try to find a scource of financial help for their customers—this service will enable one to secure many a profitable contract that would otherwise slip by.

Our Cover Design

THE home illustrated on our cover this month is a little out of the ordinary, one would hardly think it being near the big metropolis of the Mid-West. It is located on North Shore Road, Hubbard's Woods, near Chicago.

The house is an all shingled design and some of the novel features are the shingled garage doors, the recessed front entrance and the large chimney which contains the flues of the furnace, kitchen range, and the living room and dining room fireplaces.

It is in cozy homes like this that have recently been completed throughout our country that many late distressed rent payers will really enjoy a Thanksgiving Day in a home of their own. The building contractors of our country are even now getting ready to do their share next year by increasing their equipment to handle a larger volume of work.

Watch the Wrapper

CANDY would be just as sweet if packed in a shoe box, wrapped in last night's paper, and tied with an old piece of rag.

But it would not sell as well.

Your merchandise may be as good as that of any of your competitors, but your customers will not feel that it is as good unless you stack it as carefully and keep its surroundings as attractive.

A clean, inviting, and efficient looking place of business is the first step in advertising, the next step is when your job is finished turn it over clean, remove rubbish, odds and ends of equipment, etc., clean the inside of the house as well, make the owner delighted with just a little extra touch—just like the candyman's wrapper—and your customers will be glad to say, "Jones built this house."

Helping Workmen to Own Homes

NORTH DAKOTA is organizing a State Home Building Association to provide cheap homes for industrial workers; the plan contemplated requires the prospective home owner to pay 20 per cent. of the cost of the house and lot into the association before the remaining 80 per cent. is given. In cases where the total cost is over $5,000, the home owners must finance themselves for any amount over that sum. The 80 per cent. balance is payable over a twenty-year period, which brings the monthly payments within the reach of the workingman's pocketbook. A ten-year amortized mortgage is very good and has helped many thousands to own a home of their own, but to many others the monthly payments are so high by this plan that they simply can't pay it, but spread over a period of twenty years the payments are small enough so that they can be met by a man of moderate income. Financial houses have always to look at the safety of their investments, and for this reason they prefer as short a time as possible for any mortgage they may make; neighborhods frequently change with a depreciation in the value of the property, and if this drop should be below the amount of the mortgage the loaning company faces a loss. On the other hand, a man who is working to pay off a loan on his home is a very desirable moral risk—his all in most cases is invested in the home and he will strive his utmost to meet the payments.

America's Making

THE first two weeks of this month will see in New York a series of pageants to pay tribute to the races everywhere which have contributed to the greatness of these United States. Each nation will set forth its gifts—will show just exactly what it has done for this country and will tell what its influence has meant to the land.

America is still in the making. There is nothing at all final about its present status. Everyone, whether foreign or native, can bring to it his finest and best, the pride of his effort, and can help to make the place where he lives more just and more worthwhile by his own attitude toward it. The place where we live is so susceptible to our attitude. If we maintain a wholesome, helpful spirit, a willingness to live in harmony with those about us, a desire to appreciate the fineness in them, America and we—aliens and natives alike—who are making America will do more to set the world on its feet than any talk of economics and theorizing that comes from study tables. It all resolves itself into willingness—desire to move with the current of public good and not against it.

The series of pageants representing America's making is the idea of the late Franklin P. Lane, secretary of labor in the last administration, and memorializes in a sense, one who, himself an immigrant, rose to the heights of an unselfish usefulness in the carrying forward of his best efforts in behalf of his adopted country. We of today, with our increased knowledge and facilities, dare not rest upon the laurels of those whose efforts in the past have brought America to the dignity it now holds among the nations of the world. The present summing up must be but a point of departure for new effort and greater hope for mutual appreciation and understanding.

Wage Scales in the Building Trades

Compiled by The National Association of Builders' Exchanges and Prevailing September 30, 1921.

	Carpenters	Cement Finishers	Electricians	Hod Carriers	Laborers	Lathers	Painters	Plasterers	Plasterers' Helpers	Bricklayers	Elevator Constructors	Gas Fitters	Hoisting Engineers	Marble Cutters	Marble Setters	Masons	Ornamental Iron	Pipe Coverers	Plumbers	Roofers	Sheet Metal	Steam-Fitters	Steam Fitters Helpers	Stone Cutters	Structural Iron	Tile Setters
Atlanta, Ga.	.70	.90	1.00	.30 .40	.15 .25	.90 1.00	.50 .60	.90	.30	.90	1.00	.75 1.00	....	....	1.00	.90	.90 1.00	.80 .90	1.00	.80 .90	1.00	1.00	.40	1.00	.90 1.00	1.00
Baltimore, Md......	.80	1.00	1.00	.75	.30 .40	1.00	.87½	1.25	.75	1.25	1.00	1.00	.90 1.00	1.00	1.00	1.25	.80 1.00	1.00	1.00	.75 1.00	.70 .90	1.00	.75	1.00	.90 1.00	1.00
Buffalo, N. Y.......	.80	.60 .80	.90	.40 .50	.25 .40	1.00	.75	1.00	.45 .60	1.00	.97½	.90	1.00	1.00	1.00	1.00	.75	1.00	1.00	.40 1.00	.87½	.90	.20 .40	1.00	1.00	.85
Boston, Mass.	.90	.90	.90	.60	.55 .60	.90	.90	.90	.70	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.60	.90	.90	.90
Chicago, Ill.........	†	.85	1.10	.72½	.72½	1.00	†	†	.78¾	1.10	†	.95	.85 1.10	....	.87½	....	.95	.95	.95	.92½ 1.00	†	.95	....	1.02½	1.05	1.02½
Cincinnati, Ohio...	1.00	.90	....	.85	.45	1.00	.87½	1.12½	.85	1.25	1.00	1.00	1.12½	1.06	1.06	.90	.90	.95	1.00	.70 1.00	80.	1.00	.60	1.15	.90	1.00
Cleveland, Ohio....	1.04	1.04	1.10	.60	.57½	1.04	.93	1.04	.60	1.04	1.06¼	....	1.04	1.06¼	1.06¼	1.04	1.04	.93	1.10	.83 1.04	1.04	1.04	.62¼	1.04	1.04	....
Columbia, S. C.....	.45 .60	.45 .60	1.00	.25	.20	3.00 perM	.50 .60	.75	.25	.75	....	.60	.60 .75	1.00	1.25	1.25	.70 .80	1.25	1.25	.90	.90	1.25	.50	1.00	.70 .80	.90 1.00
Des Moines, Ia......	.92	.90	.75	.65	....	....	.80	1.11¼	....	1.11½	....	....	.90	....	....	....	....	1.25	1.25	....	.93¾	1.25	....	....	.90	....
Detroit, Mich.* ...	.80	.70	.87½	....	.50	1.00	.80	1.00	.75	1.00	1.00	....	....	.80	1.00	1.00	....	.93¾	1.00	.65	.80	1.00	.60	.90	.90 1.00	....
Duluth, Minn.	.80	.80	.80	.45 .60	.35 .50	.80	.80	1.00	.55 .65	1.00	....	.80	.65 .80	....	1.00	.80	.80	.80	.80	.75	.80	.80	.50 .75	1.00	.80	1.00
Indianapolis, Ind...	.92½	.90	1.00	.67½ .70	.35	.90	....	1.12½	.70	1.15	1.00	1.15	.92½ 1.15	.65	1.00	1.15	1.15	.80	1.15	.60	.92½	1.15	.65	1.00	1.15	1.00
Little Rock, Ark...	.65 .80	1.00	.92	.40	.30	1.00 1.25	.90	1.12	....	1.00	....	1.00	....	1.00	1.00	1.00	....	....	1.00 1.25	.70 .90	1.00	1.25	....	1.00	.87	1.00
Los Angeles, Cal. (rate per day)..	7.00 8.00	8.00	8.00	9.00	4.00 5.00	8.00	7.00 9.00	10.00	9.00	10.00	7.00	9.00	8.00	8.00	8.00	10.00	8.00	8.00	9.00	7.00 8.00	8.00	9.00	7.00	....	8.00	8.00
Louisville, Ky.	.80	.60 1.00	.75 .87½	.80	.35 .40	7.90 day	.50 .87½	1.12½	.80	1.25	....	1.00	....	....	....	....	....	....	1.00	.80	.80	1.12½	....	....	.90	....
Memphis, Tenn. ..	.60 .80	.60 .80	.80	.62½	.25	1.00	.87½	1.12½	.62½	1.12½	.95	....	.75 1.00	1.00	1.00	1.12½	.75 1.00	....	1.12½	.40	.87½	1.12½	.50	1.00	.75 1.00	1.00
Milwaukee, Wis....	.85	.65	1.00	.65	.40 up	1.00	.85	1.12½	....	1.00	1.00	1.00	1.00	.90	1.06¼	1.00	1.00	.60 .85	1.00	.75 up	.75 .80	.90	.57½	.90	1.00	1.00
New York, N. Y....	1.12½	1.12½	1.12½	.87½	.81½	1.12½	1.12½	1.25	.93¾	1.25	1.12½	1.12½	1.25	1.12½	1.12½	1.25	1.12½	1.12½	1.12½	1.12½	1.12½	1.12½	.87½	1.12½	1.12½	1.12½
Norfolk, Va.	.65 .75	.50 .65	.65 .75	.50 .60	.35	.75	.65 .75	.87½ 1.00	.50 .60	1.12½	....	....	....	....	....	1.12½	.75 .85	....	1.00	.75 .87½	.75 .87½	1.00	....	1.00	.75 .85	....
Okla. City, Okla....	Day rates 7.00	8.00	7.00	....	....	8.00	7.00	9.00	....	9.00	....	....	7.00	....	8.50	....	....	....	....	6.00	7.00	....	....	....	....	9.00
Omaha, Nebr.	.75 1.00	1.00	1.12½	.60	.40 .50	1.00	1.00	1.25	.65	1.12½	....	1.25	1.25	1.00	1.00	1.12½	1.12½	1.25	1.25	....	1.12½	1.25	....	1.12½	1.12½	1.00
Philadelphia, Pa...	.90	.80	.90	.75	.50 .60	.90	.80	1.00	.80	1.00	.90	.90	.90	.80	.80	1.00	.90	.80	.90	.90	.90	.90	.75	.90	.90	.80
Pittsburgh, Pa. ...	1.00	.87½	1.00	.80	....	.90	1.12½	1.12½	....	1.12½	1.00	1.00	1.00	1.06¼	1.06¼	1.00	1.00	....	1.00	1.00	1.00	1.00	.60	1.00	1.00	1.00
Raleigh, N. C.......	.60	.75	1.00	.25 .30	.25	.50	.50	.80	.40	.80	....	....	....	....	....	....	....	....	.90	.60	.60	1.00	....	....	....	1.10
Richmond, Va.	.72½ .80	.50 .65	.75	.40 .50	.25 .30	.75	.75	.82½	.50	.87½ 1.00	.85 .90	.85 .90	.90	1.00	1.00	1.00	.85 .95	....	.85 .95	.65 .75	.75	.90	.50	.85 1.00	1.00	.85 1.00
Rochester, N. Y....	1.00	1.25	1.10	.65	.65	.90	1.00	1.25	....	1.25	1.00	1.10	45-48 week	1.00	1.00	1.25	1.25	1.00	1.10	.90	1.00	1.10	2.80-3.80 day	1.00	1.25	1.00
Savannah, Ga. ...	.50 .80	.50	.75	....	.25 .30	....	6.00 day	6.00 day	....	.87½	....	....	....	....	1.00	....	....	....	1.00	....	.75 .82½	....	....	1.00	.80	1.00
St. Louis, Mo......	1.25	1.25	1.25	.85	.67½	1.25	1.25	1.37½	.85	1.25	1.25	1.00	1.25 1.37½	1.06¼	.72½	1.00	1.25	1.25	1.00	1.00	1.25	1.25	.75	.72½	1.25	1.00
Washington, D. C.	1.05	1.00	1.06¼	.62½ .75	.35 .50	1.12½	1.00	1.25	.62½ .75	1.25	1.25	1.06¼	1.00	1.00	1.12½	1.12½	1.25	1.00	1.06¼	.60 1.15	1.00	1.06¼	.65	1.00	1.25	1.00

NOTE—Where two figures are shown they are the minimum and maximum wages paid. All figures are for hour rates except where otherwise indicated.

*Detroit wage scales reported by E. F. Hascall, secretary Builders' and Traders' Exchange.

†Chicago carpenters, painters, plasterers, elevator constructors, and sheet metal not in arbitration; old scale $1.25. All scales reported for Chicago from Judge Landis, September 7, 1921, decision.

Review of Building Situation

CONSTRUCTION activity in September, according to figures published by the F. W. Dodge Co., show that the total contracts awarded (not contemplated) in the New York territory amounted to $89,986,900, which is 41 per cent. greater than the total for August. For the past ten years in this district September figures have been 8 per cent. less than August. This establishes a new record in contracts actually awarded and is a forecast in the increased business that may be counted on for 1922. When one considers the fact that in the New York territory building trade wages have not been reduced from last year's figures the September building record is the more remarkable.

In the 27 Northeastern States the contracts awarded during September totaled $246,186,000! This is the largest monthly total reached this year and is the largest September total on record! The building business in the East is truly a big business.

The building activity is not only in evidence in the East but throughout the country. The total amount of contracts awarded in September was 11½ per cent. greater than in August, and this is the largest September total on our records. Of course the phenomenal increase in the Eastern business helps increase the general average. The Pittsburgh district shows a substantial increase over August. Chicago's increase is much less than the normal seasonal decline; Philadelphia's is about equal to the normal seasonal decline.

Residential building continues in the lead, but there has been a large increase also in business buildings.

1921 Prices Lower

THE United States Department of Labor has computed interesting statistics regarding prices now and comparing them with 1920 prices for September. They show that farm products have declined nearly 42 per cent., food 34½ per cent., and cloths and clothing 32¾ per cent. Measured in the same manner, fuel and lighting materials and metals and metal products have declined over 37 per cent., building materials over 39 per cent., and chemicals and drugs over 27 per cent., in average price. House furnishing goods were nearly 40 per cent. cheaper, and miscellaneous commodities were nearly 39 per cent. cheaper in September than in the corresponding month of last year. All commodities, considered in the aggregate, decreased 37 per cent. in the twelve months.

Pittsburgh Builders Are Busy

IN an interesting letter to the Editor of BUILDING AGE the Pittsburgh Chamber of Commerce reports that there is more building going on in Pittsburgh today than at any time within the past ten years. Entirely new fronts are being put in a half dozen business houses on the main business street and several of them are having another story added to take care of expanding business. There is not a single store room available in the ten blocks of this street, and one dry goods concern is doing business in a large tent on a vacant lot just off the main street, being the best location to be secured for immediate use.

Record of September, 1921, Building Contracts Awarded

Classification of Building	SECTION OF COUNTRY						
	New England District	New York District	Mid. Atlantic District	Pittsburg District	Middle West District	North West District	Totals
Business	$2,839,600	$17,682,900	$4,036,300	$8,033,100	$7,805,500	$861,200	$41,258,600
Educational	1,240,500	5,770,000	2,068,000	9,133,700	6,805,200	1,442,000	26,459,400
Hospitals and Institutions	758,500	5,482,100	2,445,500	479,500	2,407,700	305,000	11,878,300
Industrial	1,393,900	2,032,100	2,624,200	1,886,300	3,199,500	147,300	11,283,300
Military and Naval	135,900	4,000	30,800	200,000	1,700,000	427,900	2,498,600
Public Buildings	519,300	98,400	473,400	102,000	1,426,400	....	2,619,500
Public Works and Utilities	844,100	3,929,100	7,873,300	8,576,200	13,023,800	1,167,200	35,413,700
Religious and Memorial	498,200	2,248,000	1,763,500	1,113,500	1,910,000	245,000	7,778,200
Residential	6,984,100	48,353,300	11,451,700	10,268,500	16,013,800	2,231,900	95,303,300
Social and Recreational	811,900	4,387,000	1,352,200	1,092,300	3,861,500	188,000	11,692,900
Miscellaneous	....	....	....	....	....	....	....
Total	$16,026,000	$89,986,900	$34,118,900	$40,885,100	$58,153,400	$7,015,500	$246,185,800

Building Projects Contemplated September, 1921

Classification of Building	SECTION OF COUNTRY						
	New England District	New York District	Mid. Atlantic District	Pittsburg District	Middle West District	North West District	Totals
Business	$3,825,400	$5,048,300	$7,856,700	$7,656,200	$14,171,500	$1,340,700	$39,898,800
Educational	2,906,000	1,686,600	6,565,600	2,520,900	7,129,400	942,500	21,751,000
Hospitals and Institutions	637,900	620,500	2,985,500	606,400	2,627,100	370,000	7,847,400
Industrial	1,780,500	3,728,200	4,500,900	2,900,400	8,285,500	331,500	21,527,000
Military and Naval	35,000	50,000	....	55,000	65,000	205,000	410,000
Public Buildings	82,000	265,000	747,000	335,000	299,100	459,000	2,187,100
Public Works and Utilities	2,491,900	5,256,000	9,598,900	8,689,000	29,615,100	6,324,600	61,975,500
Religious and Memorial	234,200	637,500	2,888,300	856,500	2,094,000	250,000	6,960,500
Residential	8,307,100	52,161,100	19,844,500	18,535,200	35,179,600	3,059,300	137,086,800
Social and Recreational	2,057,500	3,802,000	3,281,000	1,851,000	7,018,500	351,500	18,361,500
Miscellaneous	....	....	25,000	....	....	....	25,000
Total	$22,357,500	$73,255,200	$58,293,400	$44,005,600	$106,484,800	$13,634,100	$318,030,600

Trend of Material Prices

THE following are wholesale prices of basic building materials in the three markets which set prices for the rest of the country.

These prices are presented to show the trend of the wholesale market, which forecasts prices in the retail market. They are not prices which the average contractor can buy at, but are quoted to show him the movement of materials so that he can buy to better advantage.

Followed in conjunction with the Review of Building Conditions, these prices will prove invaluable.

All prices are for carload lots, F. O. B. market quoted, unless otherwise noted.

NEW YORK PRICES

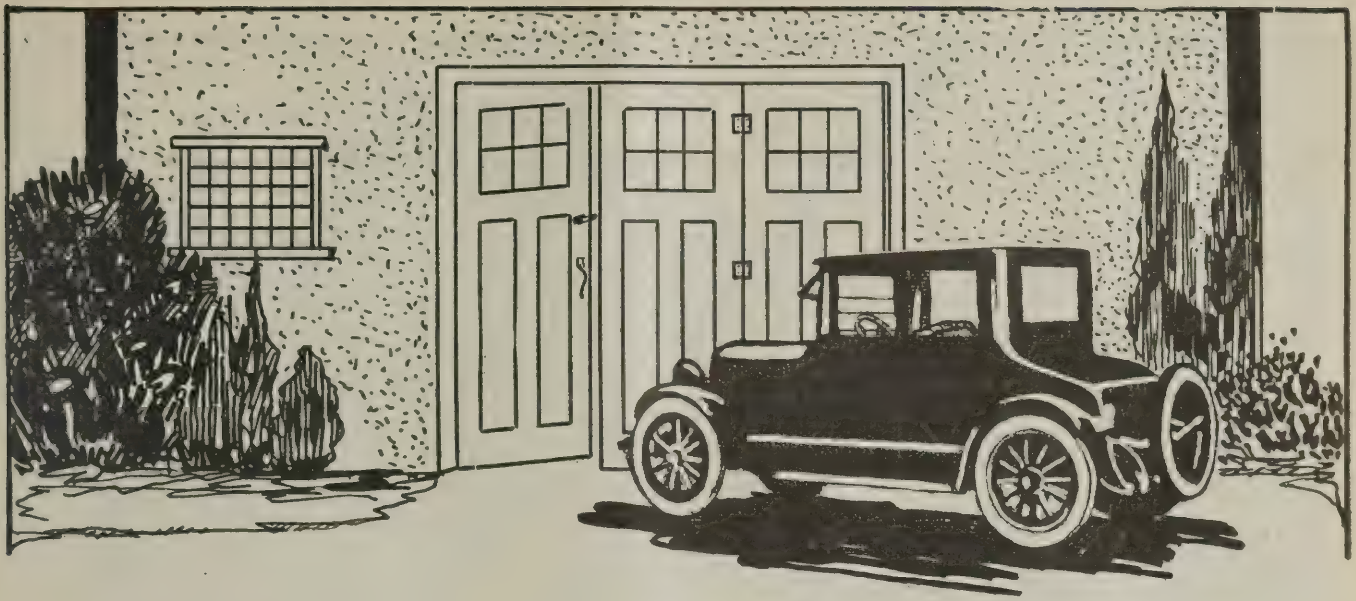
	Sept. 23	Oct. 21
LONG LEAF YELLOW PINE		
B. and Better Flat Grain Flooring, 2½" Face	$56.50	$65.50
Dimension, S1S1E, No. 1 Common, 2x4", 10'	38.00	38.00
Timbers, Merchantable, '05, 12x12", 10 to 20'	47.00	50.00
B. and Better Ceiling, ½x3¼	36.00	41.00
B. and Better Finish, 1x4"	56.00	62.50
No. 1 Common Boards, 1x8"	40.00	41.00
NORTH CAROLINA PINE—		
No. 2 and Better Flooring, 13/16x2½"	$56.00	$65.00
Roofers, 13/16x5½"	26.50	31.50
DOUGLAS FIR—		
No. 2 Clear and Better V. G. Flooring, 1x3"	$75.50	$78.50
No. 1 Clear V. G. Flooring, 1x4"	74.00	76.00
No. 2 Clear and Better Ceiling, ⅝x4"	36.00	43.00
No. 2 Clear and Better Novelty Siding, 1x6"	44.00	52.25
No. 2 Clear and Better V. G. Stepping	87.00	90.00
Dimension, S1S1E, 2x4", 16'	40.00	40.00
Timbers, S1S1E, 12x12", 16'	54.00	54.00
WESTERN RED CEDAR—		
B. C. Perfection Shingles, per M	$7.25	$7.70
Washington Perfection Shingles, per M	7.00	7.35
Clear Bevel Siding, 1½x6"	44.50	48.00
CANADIAN SPRUCE—		
No. 1 Lath, 1½"	$10.00	$10.38
Dimension, 2x4", 10 to 16'	36.00	34.00
HARDWOOD FLOORING—		
Clear Quartered White Oak, 13/16x2x2¼"	$137.50	$137.50
Clear Plain White Oak	97.50	97.50
Clear Maple, 13/16x2¼"	96.50	96.50
Clear Quartered White Oak Parquetry Strips, 5/16x2"	142.50	142.50
Clear Plain White Oak Parquetry Strips	87.50	87.50
(All lumber prices furnished by LUMBER)		
COMMON BRICK—		
Per M. f. o. b. job	$18.40	$18.40
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers, f. o. b. dock	$2.40	$2.60
STRUCTURAL STEEL (IRON AGE)—		
Cents per lb. to large buyers	$2.23	$2.88
CRUSHED STONE (cu. yd.)—		
¾ in.	$2.60	$2.75
1½ in.	2.45	2.60
WALL BOARD—		
Per 1,000 sq. ft. in lots under 1,000 sq. ft.	$52.50	$52.50
Per 1,000 sq. ft. in lots 1,000 to 2,500 sq. ft.	47.50	47.50
METAL LATH—		
2.3 lb.—warehouse price per 100 sq. yd.	$22.64	$22.64
2.8 lb.—warehouse price per 100 sq. yd.	26.60	26.60
3.4 lb.—warehouse price per 100 sq. yd.	29.33	29.33
Add 5 cents per sq. yd. for galvanized.		
LIME (Hydrate)—		
Finishing, per ton	$26.00	$26.00
Masons, per ton	20.50	20.50
SAND AND GRAVEL (cu. yd.)—		
Sand	$1.60	$1.50
¾ in. gravel	2.75	2.75
1½ gravel	2.75	2.75

CHICAGO PRICES

YELLOW PINE—		
Boards, 1x8, No. 1 Com	$33.50	$36.00
Casing and Base, 4-6 in.	58.00	60.00
Ceiling, ⅝x4, B. and Btr	36.50	40.50
Dimension No. 1, 2x4, 12 to 14 ft	40.00	33.00
Drop Siding, 1x6, B. and Btr	38.00	43.00
Finish, 1x4, B. and Btr	51.00	54.50
Flooring, B. and Btr. E. G., 1x3	74.00	78.00
Lath, 4 ft., No. 1	6.90	7.55
Timbers, Long Leaf No. 1, 10-20 ft., S4S, 6x12 to 12x12	39.00	38.00
NORTHERN HEMLOCK—		
Boards, No. 1, 8 to 16 ft., 1x6 to 8 in.	$29.00	$29.00
Lath, 4 ft., No. 1	9.25	9.25
DOUGLAS FIR—		
Boards, No. 1, S2S, ¾ in., 1x8 to 10 in.	$27.75	$29.25
Dimension, No. 1, S1S1E, 8 ft., 12 ft., 14 ft., 2x4 in.	29.60	29.50
Drop Siding, 1x6 Pat. 106, No. 2, C. and Btr	38.50	45.50
Flooring V. G., 1x4, No. 1	66.50	69.50
Lath, 4 ft., No. 1	9.60	8.50
Timbers, No. 1 Com., 12x12 in. and under, 40 ft. and under, rough	37.00	37.00
HARDWOODS—		
Maple Flooring, 13/16x2¼, clear	$94.75	$90.00
Oak Flooring, 13/16x2¼, Cl. Pl., White	104.00	104.00
REDWOOD—		
Bevel Siding, S1S1E, 10 ft., 20 ft., ½x4, clear	$38.25	$38.25
Finish, S2S or S4S, 1x6 to 8 in.	91.50	81.50
WESTERN RED CEDAR—		
Bevel Siding, ½x4 in., Clear	$42.00	$43.00
Shingles, Extra Clears, 16 in.	4.65	5.20
COMMON BRICK—		
Per M. f. o. b. job	$12.00	$12.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers	$1.97	$1.97
STRUCTURAL STEEL—		
Cents per lb. to large buyers	$2.23	$2.88
CRUSHED STONE (cu. yd.)—		
¾ in.	$1.75	$1.75
1½ in.	1.75	1.75
WALL BOARD—		
Per 1,000 sq. ft. in lots under M	$57.50	$57.50
Per 1,000 sq. ft. in lots 1 M to 2½ M	52.50	52.50
SAND AND GRAVEL (cu. yd.)—		
Sand	.....	$1.75
¾ in. gravel	$1.75	1.75
1½ in. gravel	1.75	1.75

ST. LOUIS PRICES

YELLOW PINE—		
Boards, No. 1 Com. 1x4	.....	$30.50
Partition, ¾x3¼, B. and Btr	$45.50	53.00
Dimension, No. 1, S1S1E, Short Leaf, 2x4 in., 12 & 14 ft.	26.50	30.50
Finish, S2S, B. and Btr., 1x4	50.00	56.00
Flooring, B. and Btr., E. G., 1x3	73.00	77.25
Flooring, B. and Btr., F G., 1x3	52.00	63.25
Lath, 4 ft., No. 1	6.30	7.25
Timbers, No. 1, rough, short leaf, 6x12 to 12x12 in., 18 to 20 ft.	33.00	36.00
DOUGLAS FIR—		
Ceiling, F. G., ⅝x4 in., No. 2, Cl and Btr	$31.25	$36.25
Dimension, No. 1, S1S1E, 2x4 in., 8, 12, 14 ft.	29.00	29.00
Drop Siding and Rustic, 1x6 in., No. 2, Cl and Btr	38.50	43.50
Finish, F G., S2S or S4S, 1x4 in, No. 2 Cl. and Btr	65.25	68.25
Flooring, 1x4 in., No. 1, Cl., V.G.	65.50	65.50
Stepping, V.G., 1¼x10 in. & 12 in., No. 2, Cl. & Btr.	77.75	.....
CALIFORNIA REDWOOD—		
Finish, S2S, Cl., 1x6 in.	$81.50	$81.50
Siding, 4 in. Bevel, 10 to 20 ft.	38.25	38.25
8 inch Colonial	66.75	66.75
8 inch Bungalow	68.75	68.75
HARDWOODS—		
Maple Flooring, 13/16x2¼ in., Clear	$91.75	$91.75
Oak Flooring, ⅜x1 and 2 in., Clear Qtr. White	110.00	110.00
RED CEDAR—		
Siding, ½x6, Clear	$41.00	$41.00
Shingles, Clears	4.91	4.96
COMMON BRICK—		
Per M. f. o. b. job	$17.00	$17.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers	$2.50	$2.25
STRUCTURAL STEEL—		
Cents per pound to large buyers	2.325	2.98
CRUSHED STONE (cu. yd.)—		
¾ in.	$1.825	$1.825
1½ in.	1.825	1.825
WALL BOARD—		
Per 1,000 sq. ft. in lots under M	$57.50	$57.50
Per 1,000 sq. ft. in lots 1 M to 2½ M	52.50	52.50
SAND AND GRAVEL (cu. yd.)—		
Sand	$1.40	$1.40
¾ in. gravel	1.40	1.40
1½ in. gravel	1.35	1.35
(Following prices are F.O.B. factory.)		
FACE BRICK—		
Harvards	$38.00	$38.00
Tapestry	30.00	30.00
Caledonian	26.00	26.00
Smooth Grey	35.00	35.00
Fisk Lock	35.50	35.50
SHINGLES (per square)—		
Asphalt single	$6.40	$6.40
Asphalt strip	5.75	5.75
STAINED WOOD—		
16 in. extra clear	$9.75	$9.75
18 in. Eureka	10.50	10.50
18 in. Perfection	11.50	11.50
18 in. Royal	11.40	11.40
24 in. Imperial	12.00	12.00



PAGE THE BUILDING CONTRACTORS WHO ARE LOOKING AFTER THE HOUSING OF THE

9,300,000 automobiles

now in use in this nation, and you will find a very large percentage of them using

NATIONAL
Nos. 805 and 806
Garage Door Sets

Every necessary and desirable garage hardware feature is incorporated in these handy and popular National sets. Nothing that will contribute to comfort and convenience is lacking.

Here are the qualities you have a right to expect and **find** in a first-class Garage Door Set, and here are the qualities you **do** find in the National:—

- **Correct Distribution of Load**
- **Noiselessness**
- **No Warping**
- **Easy Installation**
- **No Place for Dust to Lodge**
- **No Friction or Binding**
- **Smooth Running**
- **Economy**
- **Efficiency**
- **Proper Finish**
- **Simplicity**
- **Adjustability**
- **Adaptability**
- **Good Appearance**

Ideal arrangement of doors, providing absolutely free and easy access at all times
Hung so that they work as freely as any house door.

Ask for Garage Plan Booklet "F," and mention dealer's name.

National Manufacturing Company
STERLING ILLINOIS

New Catalogs and Publications

THESE catalogs may be secured direct from the manufacturer. If you prefer, write the date of this issue and the numbers of any catalogs on a postal and mail it to "Building Age," 912-920 Broadway, New York City. The catalogs will be sent you without charge, unless otherwise noted.

772. **The catalogue of Kolesch & Co.,** New York, is a 336-page volume for which a small charge is made. It is illustrated and covers drawing and tracing papers, sun print papers, drawing instruments and equipment. Free leaflets are also available.

773. **Woodworking Machinery** is described in the carefully indexed catalogue of the Crescent Machine Co., Leetonia, Ohio. There are 140 illustrated pages, and explaining the proper machine to be used in different types of work.

774. **The American Face Brick Assn.** of Chicago makes a charge of one dollar for its very valuable manual of face brick construction. This covers ancient and modern history of brick making, types of face brick walls, methods of construction and bonding, many face brick house designs and other valuable text and illustration. 112 pages.

775. **The Grinnell Bulletin** for October forms a special oil piping number. It is printed in Providence, R. I. The company offers engineering and construction service, automatic sprinkler devices, industrial piping, heating and power equipments, etc.

776. **National Mfg. Co.,** Sterling, Ill., is celebrating its 20th anniversay in business. A leaflet describes a few of their many models for adjustable, flexible and weathertight hinges and other builders hardware.

777. **Brick houses,** prize winners in competition, have been collected by the American Face Brick Association, Chicago, and may be had for fifty cents. The volume contains 70 pages of interesting information as to brick and its treatment.

778. **W. F. & John Barnes Co.,** Rockford, Ill., describe patent foot and hand power wood working machinery in a 35-page catalogue completely illustrated. Circular saws, boring machines, rip saws, floating attachments, mortising machines, etc., are included.

779. **The Bishopric Mfg. Co.,** Cincinnati, presents a valuable 52-page booklet illustrating Bishopric stucco and plaster base, Bishopric Sheathing, and Bishopric insulating base, telling their different uses by picture, text and full sized details.

780. **Concrete Detail service sheets** are issued by the Alpha Portland Cement Co., Easton, Pa. They cover fireplaces, comfort stations, ornamental concrete facades, doorways, cornices, etc., that are built of concrete.

781. **Merchants' Assn. of New York** has issued the Year Book for 1921. The volume contains 337 pages, and sets forth the reports of the many important bureaus of the association.

782 **Aloe's convertible level** is but one of the many useful things offered by the A. S. Aloe Co., St. Louis, Mo., and described in their literature. A ten day free trial may be had and an easy payment plan may be availed of. Catalogue contains 116 pages.

783. **J. L. Mott Iron Works,** New York, print in their 120-page booklet a fine array of plumbing fixtures and model bathrooms, in color.

784. **The Stucco House** is a book published by the Atlas Portland Cement Co. for those about to build, whether owner, architect or builder. Its 100 pages are replete with beautifully produced pictures, plans and other data of practical and useful nature.

785. **Andersen Window Frames,** as manufactured and delivered by the Andersen Lumber Co., of South Stillwater Minn., are illustrated in an interesting 16-page booklet. It would appear one of the useful ways of simplifying window problems.

786. **School and factory plumbing** is illustrated by plans and pictures in the catalogue of the J. L. Mott Iron Works, New York. 95 pages.

787. **Alpha Portland Cement Co.,** Easton, Pa., gives much of instructive interest in its 96-page booklet, bound, well printed and illustrated with pictures and construction details. The title is "Alpha Cement—How to Use it."

788. **That Caldwell Sash Balances** have much to commend them is evidenced by the leaflets on this topic issued by the Caldwell Mfg. Co., Rochester, N. Y. These may be had on application.

789. **Stanley Rule & Level Works,** New Britain, Conn., issues leaflet on the Stanley Doweling Jig, which enables the user to bore dowel holes in the edge, end or surface of work with ease and accuracy and is also an excellent bit guide for mortising.

790. **Merwin Mfg. Co., Erie, Pa.,** circulates leaflet on Herringbone Wall Ties, which insure a wall against bulging and sagging and has features of strength and utility that builders should not overlook.

791. **Smith & Egge Mfg. Co.,** Bridgeport, Conn., originators of sash chain, issue a small booklet setting forth a record of fine service performed by their product in some of the largest and most important structures throughout the country.

792. **Parks Ball Bearing Machine Co.,** Cincinnati, Ohio, issues a circular on the Big Parks Planing Mill Special which has many uncommon features to commend it. It helps to do the best, quickest work at the lowest figure.

793. **General Fireproofing Co.,** Youngstown, Ohio, makers of "Self-Sentering," have now developed "Diamond Rib Lath" for use in suspended ceilings or walls and in connection with Steel Tile and Steel Lumber floor construction. Samples and description on request.

794. **Bermico Sheathing Paper** is very wisely and interestingly described in the folders of the Brown Co., Portland, Me. They manufacture the standard sheathing that is weatherproof and non-porous, insulating a building against cold and heat.

795. **The O. K. (Overhead Kitchen)** Clothes Dryer Co., New York, issues an informative circular on the economical disposition of the wet laundry in small apartments. This company manufactures a device the simplicity and desirability of which are obvious.

796. **Novo Reliable Power** is set forth in a 105-page catalogue No. 921 issued by the Novo Engine Co., Lansing, Mich. Takes up the Novo Engine, Hoisting Outfits, Pumping Outfits for all purposes, Air Compressors and Saw Rigs. Illustrated.

797. **American Wire Fabrics Co.,** Chicago, will send sample and literature on screen wire, different type for different purposes. There are many phases to the proper selection of screening which may well be investigated by the layman and builders.

798. **Kimball Bros. Co.,** Council Bluffs, Iowa, have a very completely illustrated and explained series of catalogues and leaflets on the subject of elevators of all kinds—dumbwaiters, garage elevators, sidewalk elevators, light and heavy, hand and power machines.

799. **Hardin - Lavin Co.,** Chicago, send without charge a 256-page handyman book, containing hundreds of floor plans, elevations, diagrams, designs, etc., on heating and plumbing supplies, also giving rules, kinks, short cuts, methods and procedures.

A Kodak history of the job

shows not only the progress made from day to day but also the equipment used and methods employed. Such pictures prevent argument, because the autographic record tells date, project, station, or similar information written on the film at the time of exposure. Thus the Kodak account of the job is *permanent* and *indisputable.*

Autographic Kodaks that make pictures $3\frac{1}{4} \times 5\frac{1}{2}$ inches in size are priced from $19.00 up. At all dealers'.

EASTMAN KODAK COMPANY

ROCHESTER, N.Y., *The Kodak City.*

800. Tin Roof Designs and Service Sheets may be had from the N. & G. Taylor Co., Philadelphia, in the matter of applying Target-and-Arrow Roofing Tin. This company is established since 1810.

801. Floors of Wood-Mosaic are described interestingly in the illustrated catalogue of the Wood-Mosaic Co., New Albany, Ind. This should be in every builders' hands.

802. Sharp Rotary Ash Receiver Corp., Springfield, Mass., has valuable catalogue on simplifying ash can troubles and making the cellar clean and useful. Offers real improvement wherever installed.

803. The Story of Kellastone should be read by progressive builders, as it opens a large field in remodelling as well as in new structures. Unusual qualifications for unusual situations are set forth. National Kellastone Co., Chicago.

804. Heppes Roofing Division of the Richardson Co., Melrose Park, Ill., will supply an attractive portfolio on reroofing right over the old shingles, which offers opportunity to builders for new business.

805. Ambler Linasbestos Wall Board is described by literature and samples sent by the Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.

806. Beaver Board as an aid to indoor remodeling jobs is set forth in detailed information of the Beaver Board Companies, Buffalo, N. Y.

807. Store Fronts are ably described in pamphlets of the Kawneer Co., Niles, Mich., with reference to remodeling and new work.

808. Oil instead of Coal for homes is a panacea offered by the Nokol automatic oil heating system for the annoyances of uneven temperature, building fires, shoveling coal, removing ashes, dirt, etc. Steam Corp., Chicago, Ill.

809. National Fireproofing Co., Pittsburgh, Pa., prints two free text books, Natco Standard Fireproofing and Natco Wall Construction, both containing specifications, plans, tables and other information on the planning and erection of hollow tile buildings.

810. Resurfacing old floors with an American Universal may be done on a special proposition offered by the American Floor Surfacing Machine Co., Toledo, Ohio. Literature available.

811. Griffin Mfg. Co., Erie, Pa., has illustrated catalogue and circulars on the "Door Butt of America" and various other builders' hardware specialties.

812. Hollow Tile is a free book telling the expert's way of laying hollow tile. Published by Hollow Building Tile Association, Chicago.

813. A Portfolio of Fifty Homes—photographs—may be had from the Creo-Dipt Co., N. Tonawanda, N. Y. For beauty and economy of the shingled house.

814. Elastica, "the ideal exterior wall covering," is fully described in a booklet issued by the American Materials Co., New York.

815. The Magee Furnace Co., Boston, Mass., have issued an illustrated catalogue describing their combination coal and electric range known as the Magee ElectriCoal. It is descriptive of a new piece of kitchen equipment that the progressive builder will do well to learn about. The catalogue will be sent to any interested party.

816. Tin Roofing Data can be obtained from the N. & G. Taylor Co., 300 Chestnut street, Philadelphia, Pa. They have issued a very useful book entitled "Roof Designs" and also have several large sheets of drawings giving details of how tin should be used in building construction. Any one desiring information about flashing, lining gutters, roofing, etc., would do well to have this book and the detail sheets. They can be had by any one interested who will send 14 cents in stamps for mailing.

Book Notes

The International Directory. Published by American Bureau of Trade Extension, Washington, D. C. 7½ x 10½ inches, 728 pages, cloth bound.

This book will be of value to any firm wishing to develop foreign trade, as it gives names and addresses of export and import houses together with list of banks in the different countries. There are many valuable suggestions made and reliable data is given on shipping, finance, etc. It contains a list of salesmen and the special lines of goods they will handle.

Practical Business Methods for Contractors. By Frank R. Walker. 8½ x 11½ inches, 80 pages. Price, 50 cents. Published by The Walker Co., Chicago.

This is a second edition of a very useful book on business systems for engineers, architects and building contractors. It contains many examples of easy methods of keeping accounts, from preparing of an estimate, cost keeping on construction work, time keeping, foreman's record, payroll accounts, labor records, etc. It is a valuable book for the busy building contractor.

SPECIAL NOTICE

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of Building Age, published monthly at New York, N. Y., for October 1, 1921.

State of New York }
County of New York } ss.:

Before me, a Commissioner of Deeds, in and for the State and County aforesaid, personally appeared James T. Beard, who, having been duly sworn according to law, deposes and says that he is the editor of the BUILDING AGE, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1921, embodied in section 443, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Building Age Publishing Corporation, 912-920 Broadway, New York City.

Editors—James T. Beard, E. H. Ries, 912-920 Broadway, New York City.
Managing Editor—James T. Beard, 912-920 Broadway, New York City.
Business Manager—David Meyers, 912-920 Broadway, New York City.

2. That the owners are:
Building Age Publishing Corporation, 912-920 Broadway, New York City.
That the stockholders owning or holding one per cent. or more of the total stock of Building Age Publishing Corporation are as follows:

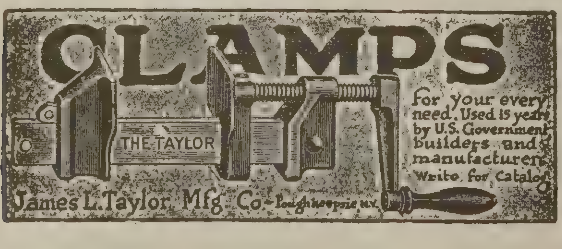
Frank Meyers, 912-920 Broadway, New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages or other securities are:
Architectural and Building Press, 243 West 39th Street, New York City.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockhloders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

JAMES T. BEARD, Editor.

Sworn to and subscribed before me this 17th day of September, 1921.
[Seal] SADYE BLUMENFELD, Commissioner of Deeds.
New York City, No. 23028.
Certificate filed N. Y. County, No. 73.


CLAMPS
THE TAYLOR
For your every need. Used 15 years by U.S. Government builders and manufacturers
Write for Catalog
James L. Taylor Mfg. Co.—Poughkeepsie N.Y.

DECORATIVE CONCRETE

You can make high grade decorative concrete with your present equipment. Exact reproductions of Marble, Granite, Onyx, etc., at ¼ the cost of marble. Also Interior and Exterior Trim, Mantels, Tiling, Composition Flooring, etc. We have no machinery or materials to sell—simply the process and formulas.

Ask us about the wonderful things you can do by the "Artisto" plan.

ART STONE CO., Box 500, WAYNESBORO, PA.

34 Architecture

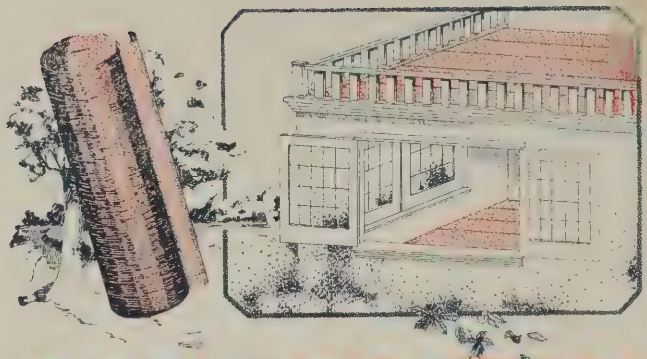
DECEMBER 1921

Building Age

[illegible]
DEC 9 [illegible]

43^RD Year

25 Cents



CON-SER-TEX

CANVAS ROOFING

For Flat Roofs and Porch Floors

—an attractive, water-proof, rot-proof, mildew-proof covering that will not crack, stretch, shrink, curl or peel. The chemical treatment applied during manufacture makes it the most advantageous material for use in covering floors, flat roofs, sun parlors, sleeping balconies, and the like. Easy to keep clean. All these features explain why it has become such a favorite with owners.

Carpenters and builders should push "Con-ser-tex" Canvas Roofing, because it enables them to secure many contracts for work on which more expensive material would be out of consideration. If you show your clients how to save money on roofing, they will let you show what service you can render them in other directions too. Con-ser-tex is easy to lay, and brings a good margin of profit.

Our Free Booklet, "Roofing Facts and Figures," illustrates and explains the many uses and advantages of Con-ser-tex.

WILLIAM L. BARRELL CO. of N. Y., Inc.

50 Leonard Street New York City

Chicago Distributors:
Geo. B. Carpenter & Co.
430-440 North Wells St.

California Distributors:
Waterhouse-Wilcox Co.
San Francisco & Los Angeles

FLOORS

The Wood-Mosaic Kind

For every home—Old or New. Can be installed by your mechanics. Our 5/16" flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood Carpet, strips Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalogue in natural wood colors.

Wood-Mosaic Company
New Albany, Indiana

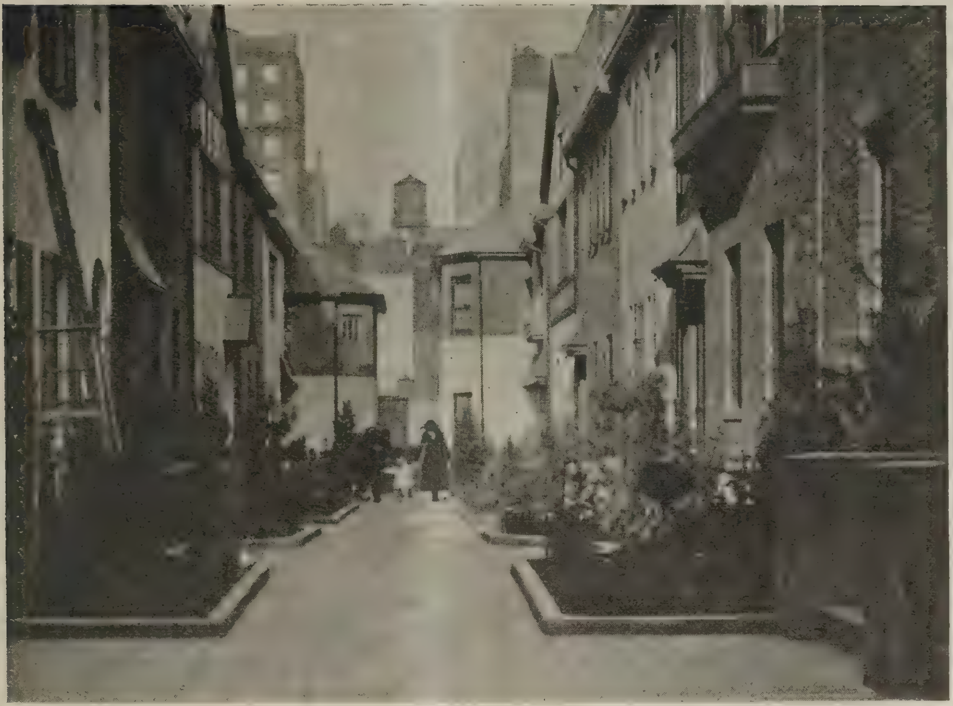
Fiberlic Wall Board

The *material* from which it is made, the fact that the pulp is *chemically cleansed* and that the *fibre lengths* give the finished product that *natural reinforcement* that is lacking in ground wood boards, is in itself a guarantee of the superiority of Fiberlic for *strong, permanent, economical* and *sanitary construction.*

MacAndrews & Forbes Company
200 Fifth Avenue, New York City
Factory: Camden, N. J.

BUILDING AGE

NEW YORK, DECEMBER, 1921



"Pomander Walk"

An Interesting Court Development of Quaint Two Family Houses Built in the Heart of New York Amongst Business Buildings and Theatres

NEW YORK CITY has its "Pomander Walk." The American copy reproduces as nearly as possible that little London colony of sentimental seclusion which Mr. George C. Taylor represented so faithfully on the stage some years ago in Louis N. Parker's play of that name.

Plans for the project were filed in the Manhattan Bureau of Buildings on behalf of Thomas Healy, the restauranteur, who has built them up on the present isle of vacant land running from Ninety-fourth to Ninety-fifth street and lying between the towering roofs of a black of West End Avenue apartment houses and the former Astor market property on the Broadway side of the square.

The Street Entrance to Pomander Walk

Mr. Healy holds a 200-year lease on this property, which has a frontage of 100 feet on Ninety-fourth and Ninety-fifth streets, a cross depth of 200 feet, and runs through the center of the block from street to street, just half way between Broadway and West End Avenue, with an adjoining lot forming an "L" 25 by 100 feet on the southeast corner of Ninety-fifth street.

The landscape work has been so planned as to allow a twenty-foot wide private street or "Walk" directly through the center of the plot, giving access both

Each Little House Is Different from Its Neighbor

ways to Ninety-fourth or Ninety-fifth street. On either side are laid out grassy lawns, adorned with fountains, shrubbery, trees and private flower gardens. There are twenty-eight houses in all, each capable of accommodating two families.

On each side of the walk proper are built a row of two-story two family houses of the English town type of architecture. The fronts of the houses are treated in a variety of design and finish. Some are of rough brick, some of cement-stucco and some of stucco and half timber. The windows and doors, though of ample size, are worked out in old English design. The treatment of the roofs also follow this style as in an English village.

Of the twenty-eight houses in this picturesque settlement, sixteen will have four rooms and bath on each of the two floors and twelve three room and bath in each apartment.

Each house, being a complete unit, will have its own private stairway to the second story apartment or suite, and each apartment will be provided with all modern equipment and conveniences. This includes a dumbwaiter from the service courts, allowing milk, butter, eggs, etc., to be delivered direct, rather than having the tradesman come to the front door.

Massive and ornate iron gates, after the period of 1710, when the original Pomander Walk was built, surrounded by the insignia of the Crowing Cock, ornament and guard either entrance to the walk, and this is presided over by uniformed lackeys.

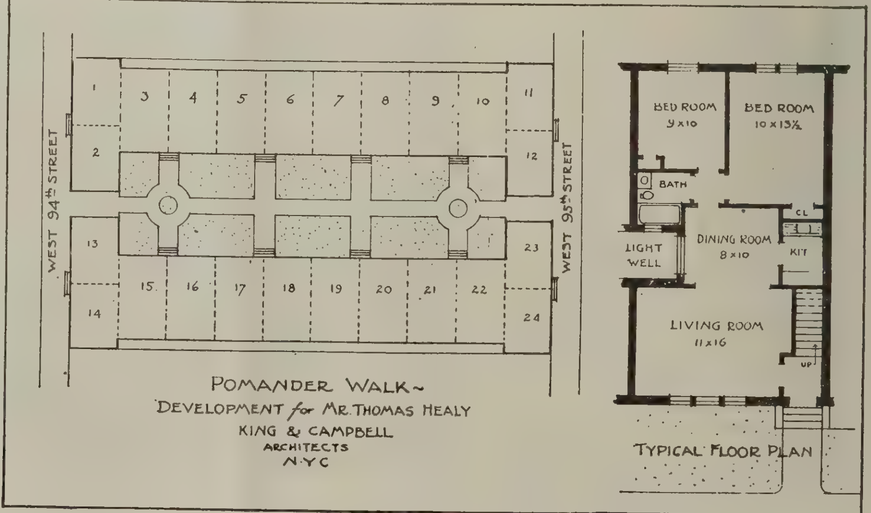
The original Pomander Walk was a quiet and contented little community, charming and quaint in its hide-away exclusiveness, in fact, one of the prettiest nooks to be found near London, and close by the banks of the Thames.

"The little houses," says Louis N. Parker, author of the tale and play of Pomander Walk, "were built in the sober and staid style introduced during the reign of Her Gracious Majesty, Queen Anne. The architect had taken a slyly humorous delight in making them miniature copies of much more pretentious town mansions.

"Each little house had its elaborate door with a shell-shaped lintel; each had its miniature garden divided from the private roadway by elaborate iron railings and each had an ornamental iron gate with link-extinguisher complete. You might have thought the houses were meant to be inhabited by very small Dukes, so stately were they in their tiny way.

"In front lay a delightful lawn aldays admirably kept. But the pride of the walk was a great elm tree standing in the center of the walk and shading its delightfulness. A very ancient tree, much older than the walk, which had in a manner of speaking, been built around it. At its base had been constructed a comfortable seat, which encircled its trunk, and this seat was the special prerogative of the ladies. In the lower corner of the lawn and facing the bend of the river stood what the inhabitants of the Walk called the "Gazebo," a little shelter formed by a well-trimmed boxwood hedge, in which was a rustic seat.

"Then there are the tiny gardens full at all seasons of the year of



How the Houses Have Been Arranged in Group Form bright, old fashioned flowers; the highly ornamental railings and stately gates; the red brick pavement or sidewalk; then a broad path, and the lawn, the elm tree and the "Gazebo." You could not find a quieter, more peaceful, quainter spot in a month's search."

From the standpoint of completion this unique development has many features that are of interest. First of all there is a community laundry—complete in itself. This consists of laundry trays, electric washers, irons and steam dryers. The idea of this laundry is that the tenants from each of the little cottages can send a maid to do the work of the family. Near the laundry are provided storage bins, each with its own number. This gives each apartment its individual place for storage.

All the exterior walls of the houses on the "Walk" proper are of brick, and to gain the desired effect and also to give the maximum of light, here and there a cottage has been picked out for its effect, and stucco applied to gain this desired result.

The treatment of the stucco deserves mention. Two kinds of finish are used—troweled and spattered—as this gives a contrast in the case of an all-stucco house. The color of the stucco is the same, but the effect of difference is obtained by the above means, namely, texture.

A great deal of attention has been paid to the general color scheme. The trim on the outside has not been carried through in brown alone, but where the effect was needed Applegreen has been employed. This may sound daring, but one must see the total effect to appreciate the beauty of this unique little village street.

At night it is adequately lighted by stands near the entrances, which gives a subdued light, enhancing the feeling of the medieval or foreign atmosphere. This has been done for practical reasons to assure a light that will be satisfactory.

At Night the Court Is Illuminated by Light from Two Standards

The half "timber" effects are of sheet metal. The roofs are different—asbestos shingles, slate, and chipped slate asphalt shingles.

It is accepted that this development is the most unique and original housing proposition in any large city. Its success and completeness is due in a large measure to the work of Messrs. King & Campbell, New York, the architects, who have so thoroughly conceived and made a reality of the idea.

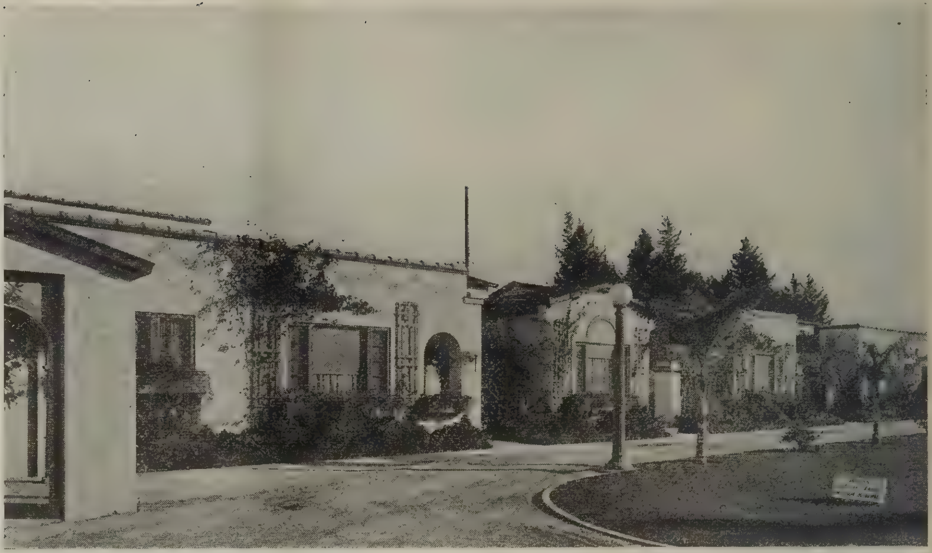
A central steam-heating plant with direct radiation supplies each cottage. This heating plant was installed by Gillis & Geoghegan, New York.

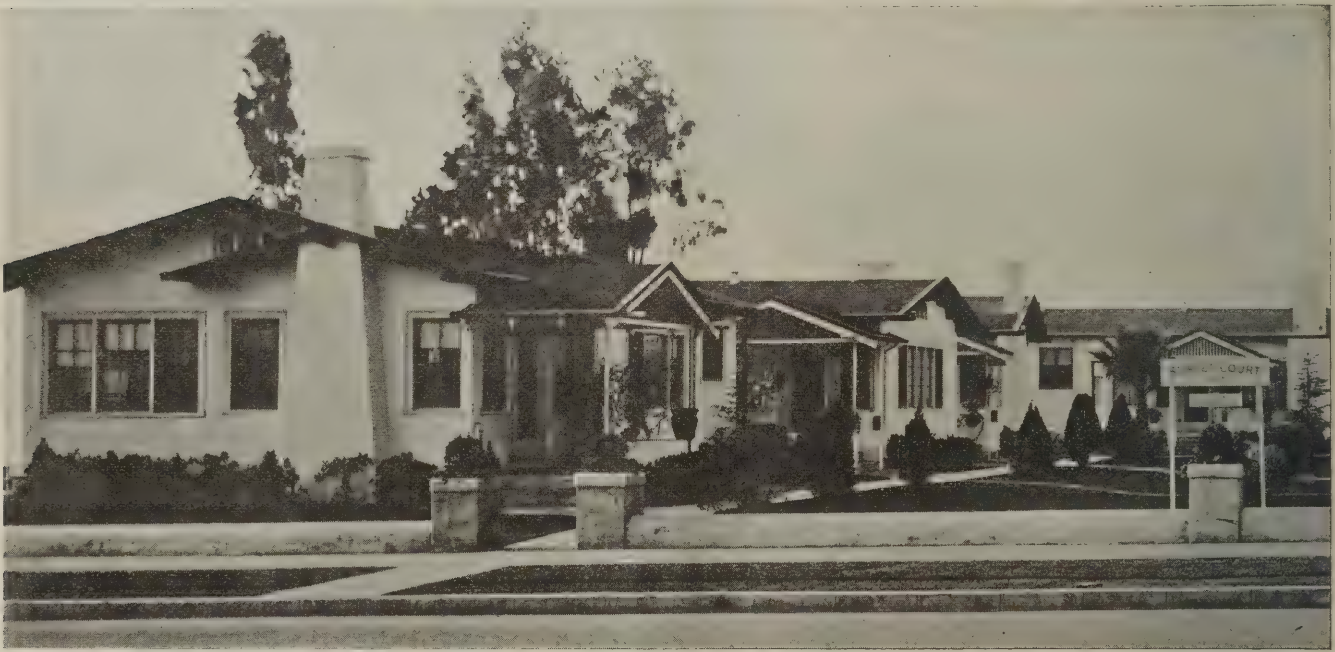
The electric work, consisting of the lighting, door bells and buzzures for the dumb waiters, was executed by George V. Cooper, 1735 Grand Central Terminal, New York.

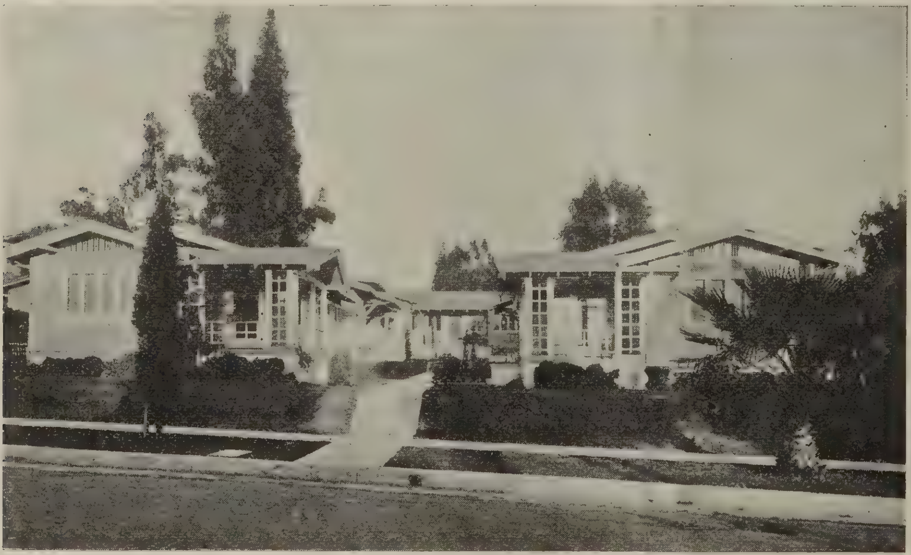
Also there is a central hot-water system which with the plumbing was carried out by John J. Foley Company, 246 West 16th Street, New York. The work of the general contractor was done by John J. McMahon, 20 West 34th Street, New York.

Putting on the Finishing Touches to a "Pomander Walk" House

Some California Bungalow Courts



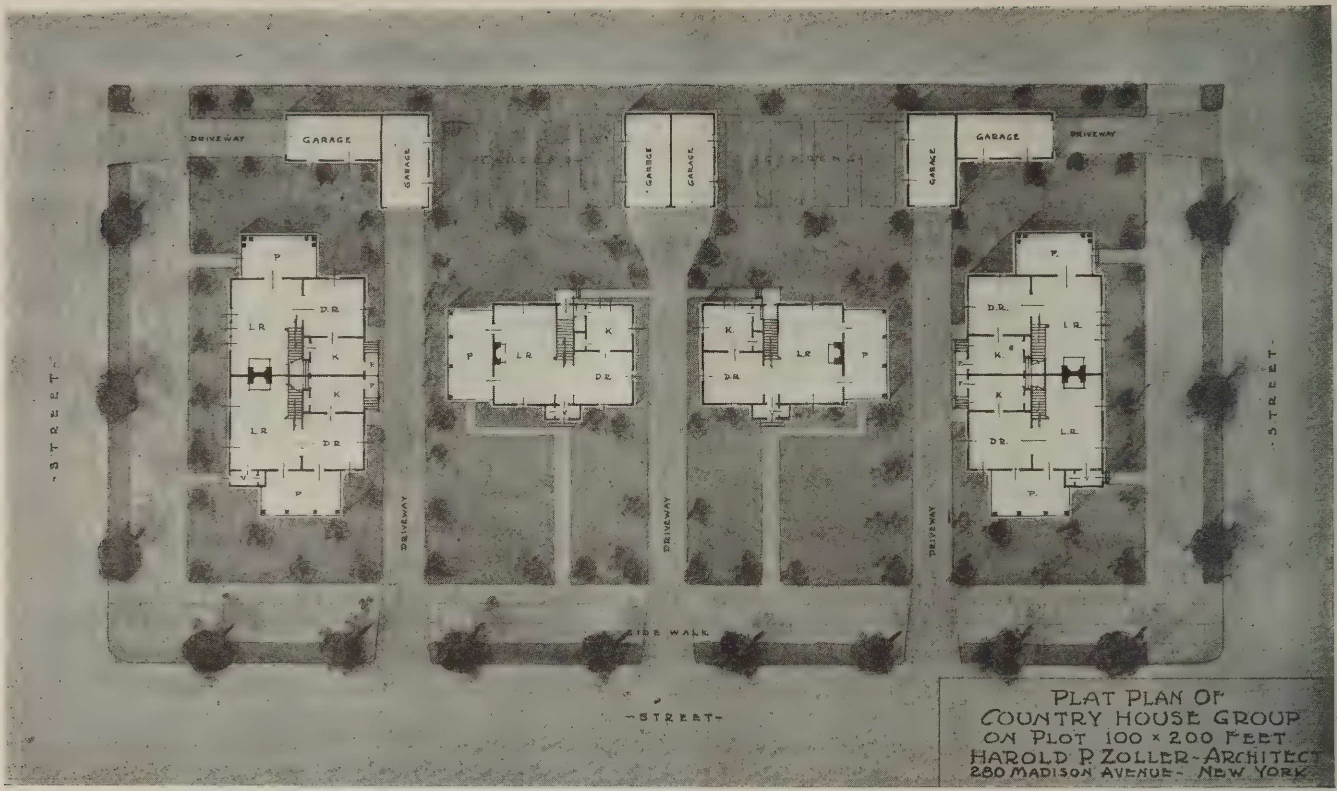




THE grouping of buildings in courts so as to form an attractive development on a small piece of property has been extensively developed in California. Many very picturesque "Bungalow Courts" have been built where each bungalow has been designed to harmonize with its neighbor's. The central parked court space is, of course, the main feature. Where space between the houses permits a driveway is employed, as shown in the top picture; in other courts only a walk is used. Lawns and shrubbery are planted so as to bring out the beauty of the court as a whole rather than the individual house.

Clever Ideas in Grouping Homes

THE pictures shown here are of five bungalow courts located in Los Angeles, California. They will serve as valuable suggestions to builders of what can be accomplished by planning buildings in group form. The court, or group idea, is not only suitable for bungalows as shown here, but can be used for the "block" or "terrace" type of houses, as so successfully carried out in the "Pomander Walk" development, described on pages 19 to 21. On pages 24 to 27 we publish an interesting article on group developments.



The Economy and Advantages of Group Development

How to Place Houses for Harmonious Appearances and Economy of Uuit Houses

By HAROLD P. ZOLLER

FOR the last year or more everyone has been watching for the boom in house construction which we all know must come, but which up to the present time is but in its first stages. With the housing shortage still unsettled and the need for homes unmet, more houses must be built, and built in even increasing numbers; for although there has been considerable activity in small house construction recently, it is still far below normal. By no means will speculative construction predominate in this activity when it gets under way. More and more, mainly because of high rents, the tenant has been made to realize in spite of himself the many and far reaching advantages of owning his own home, not only monetary advantages, but those pertaining to self freedom, physical comfort, and happiness. The mere fact that a man owns his home and is not a nomadic rent payer, gives him a position of dignity and respect in his community, for his neighbors are certain of his interest in his own place, and consequently, of his interest in the general community.

While the problem of home ownership varies with every section and must be based on an accurate survey of the conditions in that particular community, the fundamental problem revolves around economy, the reduction of cost and elimination of waste in construction.

Houses are needed for the most part by people of moderate means, and this means houses of moderate cost.

The home builder and home buyer alike are now calling for pre-war prices, and to even meet these demands halfway it behooves the architect, builder, and all others interested in house development, to economize in every conceivable way, without detracting from the design or construction of the house.

Our search for economy naturally leads us to the group development, by use of unit houses.

Starting at the conception of the idea, the architect must design such a unit house as can readily be adapted to a single or duplex house; a house that will be economical in construction, one that will meet the requirements of the normal family, and one that will readily lend itself to a variety of elevations. Granted that such a unit is possible—let us next consider the saving effected by this group construction.

First, we buy in quantity, and it does not take a technical man to realize that we can buy more cheaply wholesale. It stands to reason that better prices may be secured if we order material by the carload. We not only get a better first price, but save in freight, cartage, etc. This saving applies to all the materials used in the house, from the cement, the lumber, heating and plumbing supplies, etc., done to the finished structure.

Through the use of a standardized unit plan, although the elevations may vary as to style, the main framing is the same in all the houses. This means that but one set of forms for the concrete work is required for the group, that all studs and floor joists are cut to a uniform length, and that there is no waste in the amount of shingles, stain, etc., as is the case with one house.

Then consider the labor item. No one realizes the possible saving in this branch beter than the mechanics themselves. Call to mind the various stages of construction—the excavation, the foundation, the framing and enclosing, the rough plumbing and heating, the lathing and plastering, the trimming, the painting, metal work, etc., each one logically following in the footsteps of the other.

One has but to note how often the carpenters lose time on a job because of inclement weather, when they must work on the exterior or stop; or the painters in waiting for one coat of paint to dry before applying the next; or the masons and plumbers in their lines. But this is not the case in group building. Here with a competent foreman, whose salary is charged against the group instead of against one house, the work is so coordinated and the progress of the houses is so arranged that all mechanics are busy all the time. As soon as the excavation is finished for one house these men move to the next and their place is taken by the masons. They in turn are followed by the carpenter, then the plumber, roofers, painters, etc.

Thus, with the series in progress, when the rainy day comes, there are no idle carpenters. The men working on the outside are immediately shunted to the inside on one of the houses nearer completion. There is no longer the plumber's excuse of the missing fitting, necessitating delay and a trip back to the shop. He has work to do in one stage or another. All the mechanics can work back and forth.

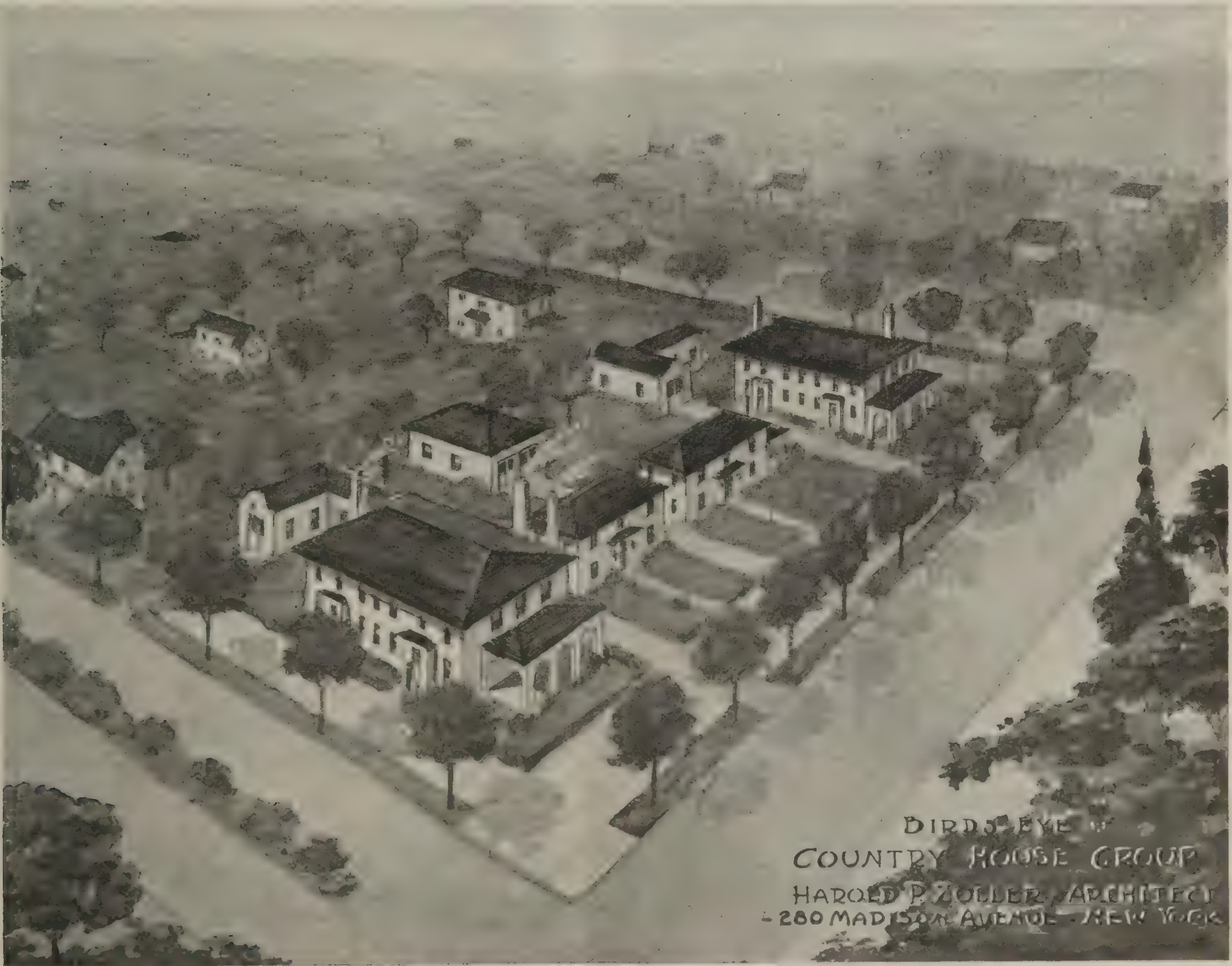
What the actual saving in money due to this coordination of the work would be on your house, we must leave to your imagination.

But group development goes even further than this actual saving in the primary cost. It safeguards the novice purchaser from all sorts of future losses and regrets, from future encroachments by structures that detract both from the beauty and value of his home.

How often have we seen a small cozy house dwarfed by a more pretentious one built beside it at a later time, or a community of larger dwellings spoiled by the addition of a shack-like house, whose smallness is only emphasized to the detriment of all, or a group of apparently motley houses, each one good in itself, but all obviously out of place and at discord with one another. Here is a case where each house is injured by its neighbors either through a clash of materials, style or cramped setting.

How much better to keep to one's kind, to have your cozy nook snuggled peacefully and in harmony with its surroundings?

But when the cost must be kept



New England Colonial Exterior

Spanish or Italian Style

down, it is often necessary to go to a partially developed section where land is still reasonable, but where the prospective owner is likely to lose sight of the gamble he takes as to his future neighbors. Oftimes, even with restricted property he finds out too late that he has neglected the possibility of some one building close to him, and his view and light is cut off.

How fine, could he eliminate the gamble and obtain one of a small group of houses of the same general style or architecture, all linked together by planting and lawn treatment, where he would be able to own a small plot with no chance of being shut in by an adjoining house, and where the neighboring houses would enhance, rather than detract from his own.

This is actually possible in several ways without the necessity of cooperative ownership, that is, without funding your resources together and owning the group on a cooperative basis.

If the man of average means can step out and buy a well built and reasonable house in a good community where the surrounding property has been developed in this way, his problem is met; and while this is a possibility, it is not an opportunity open to many, for in such developments, prices are usually high.

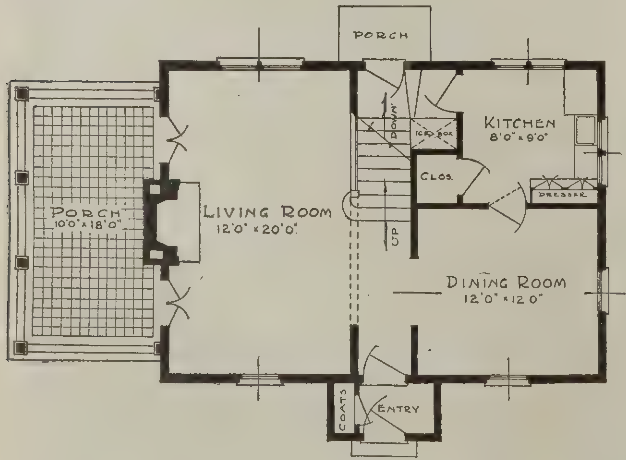
If but a few owners of adjoining property get together, and build at the same time using the same builder, it is possible to gain all the aesthetic advantages of a group, safeguard the future, and, at the same time, make a big saving in the actual construction of their own house.

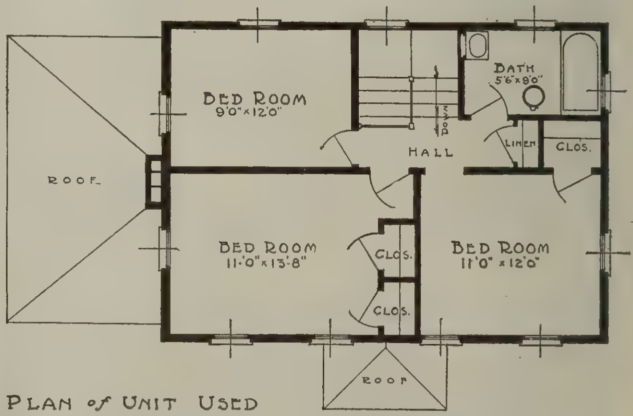
As an illustration of the possibility of this arrangement, there is offered the development of a suburban block, that is, one side of a street 200′ long with lots 100′ deep. Here the plot has been cut into four lots, 50′x100′ each, and the houses so arranged as to take the utmost advantage of all the land. As can be seen from the birds-eye perspective and plat plan, each house has a garage and driveway, plenty of lawn and garden space and in general an impression of being on more than a 50′ lot.

The two inside single houses are the main units, composed of six rooms—living room, dining room and kitchen on the first floor, and three bedrooms and bath on the second floor.

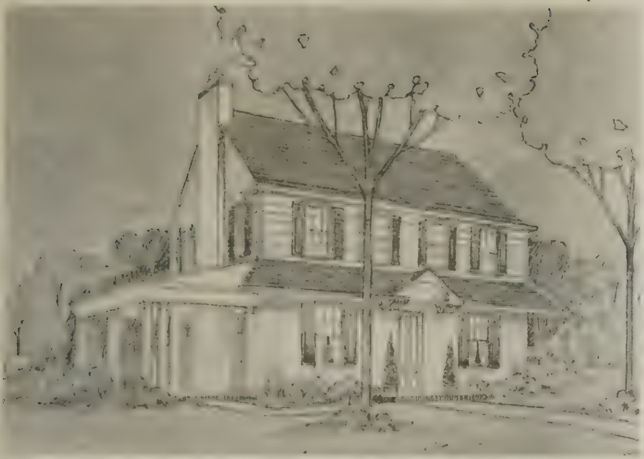
This unit has been designed with the thought of using every inch of space, and is a plan well adapted to the housewife who does her own work. With the rear entry so accessible to the cellar, an outside cellar stair and hatchway is eliminated, while at the same time the stairway is easily accessible for the laundry under the kitchen. The position of the ice box in the rear entry does away with the iceman's tramping through the kitchen, and is still convenient for the housewife as it is just off the kitchen.

The kitchen has been planned for a gas or electric range only; should

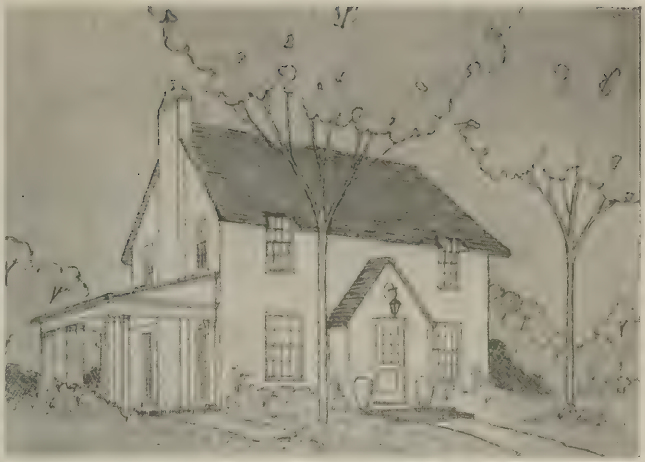




PLAN of UNIT USED FOR SINGLE HOUSE.



Pennsylvania Colonial Design



English Stucco Type

neither of these be available an extra chimney would be required for the cold range.

The bathroom is placed directly over the kitchen, securing the economy of having the plumbing pipes practically in a line. Another advantage is that, should a leak occur, the damage would be confined to these two rooms. This is a little point in design that is often overlooked.

All the rooms have two exposures with ample window space and light, and, although kept within a reasonable area, are so arranged as to give good wall space for furniture. The stairway opens to the living room, thereby giving a room 15′x20′ instead of 12′x20′.

By the compactness of the plan we have a house as readily adapted to hot air heating as steam or hot water, and for those who really know modern hot air efficiency and like this method of heating, this means another substantial saving. On account of the arrangement of the rooms a pipeless furnace would solve the heating problems if such a system is desired.

This unit is adaptable to almost any type of elevation, both as to material and style. The illustrations show a few possibilities in this respect, varying from the frame. Colonial, on through the frame and stucco Colonial with the Germantown Hood into the Spanish or Italian and English types in stucco.

The two family duplex house is developed by joining two units. This can be done in several ways, but the one shown in the plan is the most economical, for this brings all the heating and plumbing lines together. Here one chimney suffices for both houses; one plumbing line takes care of both kitchens and both baths and eliminates all branches from the main sewer line to the street.

As placed on the corner lot, this duplex house gives a complete unit for each family, and is so aranged that the two families are separated just as much as if they live next door. The elevations for the duplex house can be varied as to style the same as shown for the single unit.

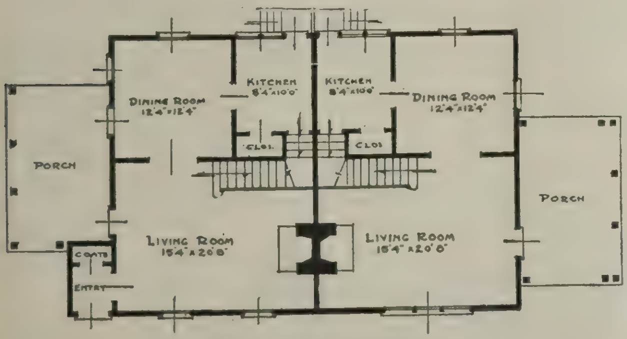
Such houses are gaining in favor every day, for as an investment, if the owner can have his house and at the same time get an income from the other section, his own estimated rent is cut to a ridiculously low figure.

With such advantages offered, and with such possible savings in cost in every item, the prospective builder, whether he builds for his own occupancy or for speculative purposes, can ill afford to overlook this method of construction.

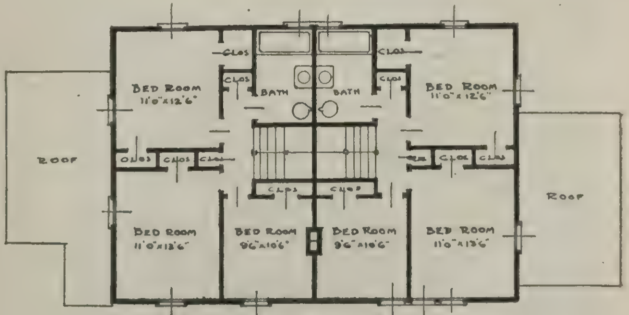
If one erects a duplex house particular care should be taken with the party wall. If the house is of frame construction the space between the studs should be filled with brick, concrete, mineral wool, etc. This filled party wall should continue right up to the roof.

The precautions just mentioned will act as a sound deadner between the two houses as well as a fire wall. The reason for carrying the filled partition to the roof is on account of the tendency of flames to "mushroom" at the top of a building.

The suggestion given here, it is hoped, will lead architects and builders to recommend to their clients the advantages and economy of building houses in related groups.



- FIRST FLOOR PLAN -
- DUPLEX - TWO-UNITS -



SECOND FLOOR PLAN -

A Well Planned Colonial Home

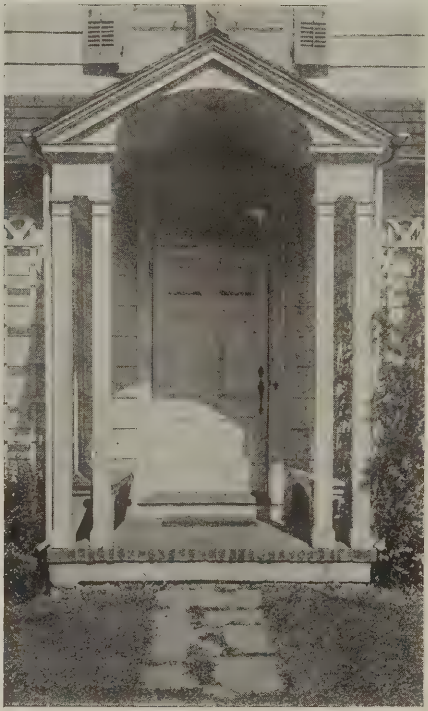
Pleasing Exterior Combined with Convenient Room Arrangement

Designed by R. C. HUNTER & BRO., Architects

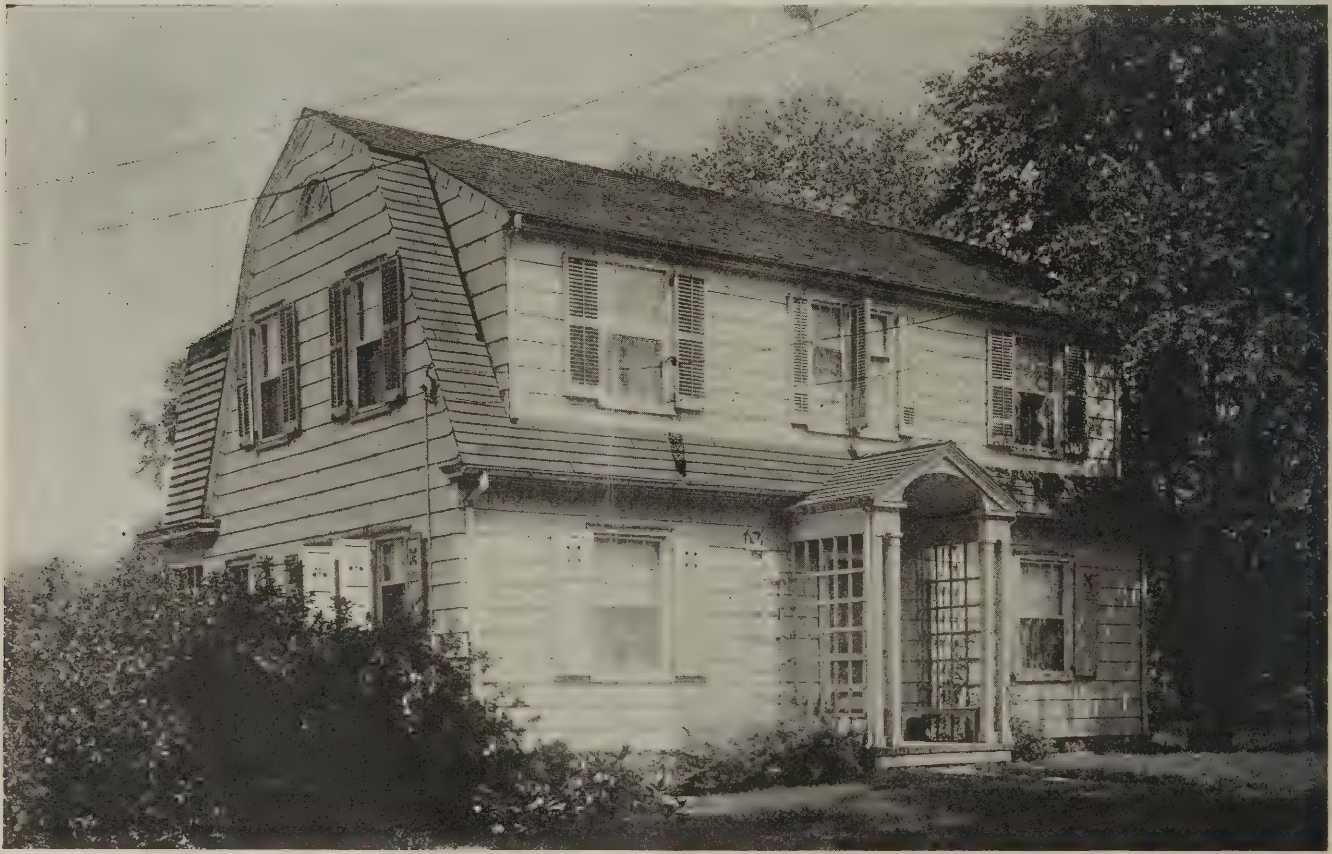
THE merits of the Colonial style for country or suburban houses needs no introduction. It has long been a recognized fact that the Colonial is a style preeminent for the American home, whether it be a modest cottage or a pretentious estate.

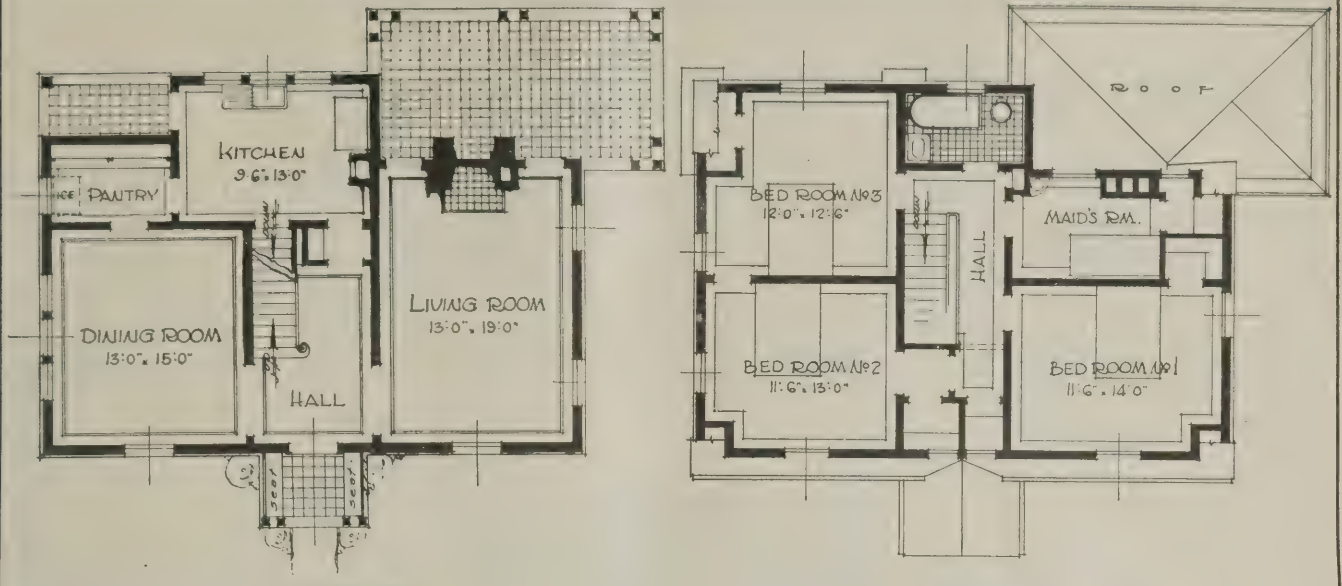
The three chief types of the Colonial—New England, Dutch and Southern—with their various modifications, offer a diversity of treatment and a variety of forms, to say nothing of the details, materials and textures, so there is no reason for monotony in the design.

It takes but a casual observer to see and to understand the charm of the old Colonial houses and why this style forms so sound a basis on which to plan the modern house. The exterior design, the plan, the interiors and furnishings, all adapt themselves to our modern ideas of living with an ease and grace that is surprising.


The Inviting Entrance

Our forefathers understood the ways of good living and this found expression in their architecture, and it is worthy of note that it was in the design of their houses where they attained such excellence. To be sure, we have a number of very fine old public buildings in the Colonial style but, practically all of these are of the later period, their number, however, appears insignificant when compared with the legion of homes built during that time. The Colonial was, and still is, essentially a domestic style.


Home of Mr. Sheldon Yates, Tenafly, N. J.



First Floor Plan

Second Floor Plan

The Colonial has withstood successfully the onslaughts of the "Mission," "Craftsman" and "Transplanted" styles, each time the Colonial has come out with new honors and finds today an unprecedented popularity that it so justly deserves.

A home is to be regarded as a place to live in rather than a technical experiment. It should be intimate in nature and in tune with our ways of living, rather than an exceptional and brilliant conception of architecture. In a word, it should be a "home."

We can copy the foreign houses but we cannot create the settings, the atmosphere and the traditions, all so essential to a real achievement, and without which the results are destined to prove disappointing.

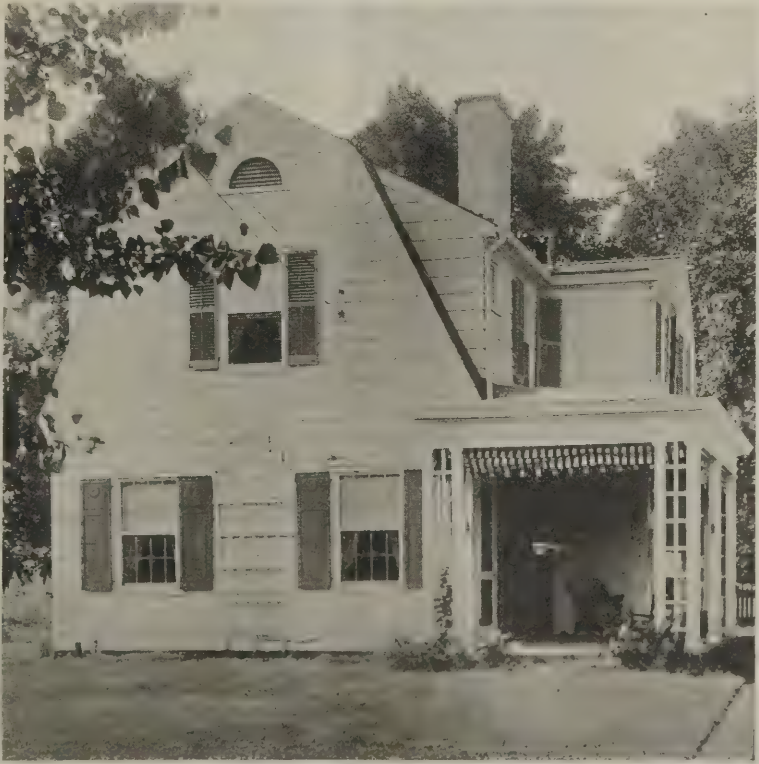
There is, at present, a strong tendency toward the adoption of these foreign styles but whether they will find universal favor for the small house in this country depends much upon the fancies of the people.

For a practical, all-around house, one, as the saying goes, "that is guaranteed all wool and a yard wide," there is nothing like the Colonial. A house that is economical to build, comfortable to live in, neat and attractive and one that requires no special "period" furnishings.

The house shown here is that of Mr. Sheldon S. Yates and is built at Tenafly, N. J. In architecture it follows the Dutch Colonial lines, admirable for the small house or cottage.

It is just the kind of a house that comes to mind when we think of a home in the suburbs—a neat white cottage with a stretch of green lawn, an entrance with climbing vines and benches to bid one welcome, and a big tree or two to shade the living porch. This is it.

The low roof, delicate detail and the simple materials, all are in keeping with a house of this character. The detail deserves special note, it is clean, crisp and refined without being effeminate.



Rear View, Showing Porch

The plans show a very roomy house for its size, and an arrangement that is convenient and livable. A generous porch with an open fireplace connects with the living room through two glazed doors at either side of the living room fireplace.

The second floor provides three bedrooms, a bath and a maid's room, the latter has a lavatory and could be used as a child's room if desired. Each room has a generous closet.

A clothes chute extends from the second floor to the laundry in the cellar.

This little house fits well in the natural surroundings and makes an ideal home.

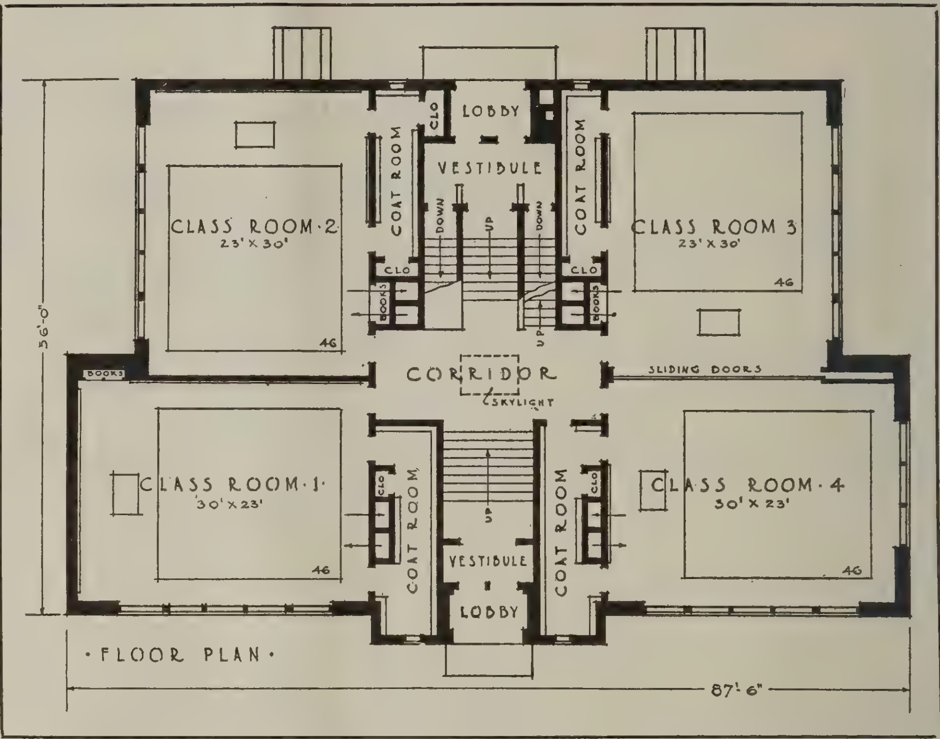
Hollow Tile School

■

A Design Suitable for a Small City

■

C. E. Schermerhorn
and
Watson K. Phillips
Architects



NEXT to homes, schools are the most important buildings in any community, and too much care and thought cannot be given to their correct planning and construction.

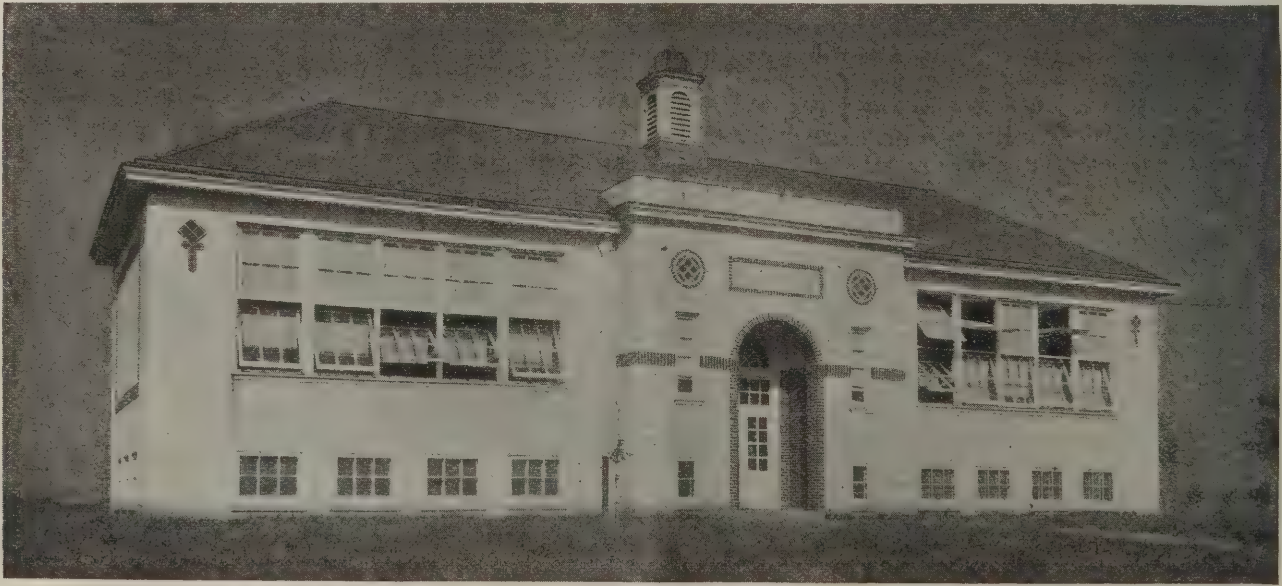
It is in the school that the child receives its first insight into the ways of other people, and it is important that the young mind be impressed with the idea that the best is being done for it. A comfortable, safe and artistic school building should be the aim of every town.

The design shown here is that of the Henry K. Boyer School, built near Collegeville, Pa., for lower Providence Township, Montgomery Co., Pa.

As will be noted from the plan, there are four school rooms, the size of each being 23 x 30 feet. There are two entrances, which makes exit safe in case of fire. Above the rear entrance, over the lobby and vestibule, a teachers' room is located. As will be noticed, class rooms 3 and 4 are connected with sliding doors so as to form a small assembly room for school and community use. The building was designed so that additions may be made to the rear.

The building is built of hollow tile, plastered on the outside with Oriental stucco. The front portion of the building has a hip roof covered with green slate; the rear portion, over class rooms 2 and 3, has a flat roof covered with slag. The building is heated by a gravity system of steam heating. The subject of ventilation also received proper attention.

This school was erected a few years ago from plans prepared by Messrs. Schermerhorn & Phillips, architects, Philadelphia, Pa. The contractor was Mr. Elmer C. Poley, of Trappe, Pa.



From Carpenter to School Builder

A Story for Building Contractors on How to Get the Most Out of a Contract and Give Satisfaction

METHODS of the successful contractor-builder today show a very fine development. How to curtail expense, how to avoid wasteful overhead, how to devise, contrive and put into execution the means that will raise a structure on the bedrock of common sense have become important and essential features of modern building. Those who get to the top in building realize that there are four basic executive essentials in which to excel, viz., the handling of equipment, the handling of materials, the handling of men and the handling of accounts. All these enter into what might be termed in one word SYSTEM, but in no job are they ever equal and in no two jobs are they ever in exactly the same proportions.

Careful Buying

A function that is important to them all is one that in times past building men intent on the physical accomplishment of raising the beams and timbers have been quite apt to ignore. This function is CAREFUL BUYING. The observance or non-observance of this function may easily spell the difference between success and failure, profit and loss—even when the active essentials on the work are carried out with a satisfactory thoroughness, quite close to or up to the 100 per cent. mark.

Know Your Materials and Plant

What the able contractor-builder needs nowadays is to keep a close eye on fundamentals. He needs plenty of courage, plus a keener scent for getting out of the job all the possibilities that are in it. He should know the plant end of his business. He should realize certain hard-headed, simple facts—that a sack of cement has an elastic limit, that an hour has just sixty minutes in it and that gravity will work for him at nothing an hour, whereas if he either chooses or is compelled at the outset to work against it, he must know how many dollars an hour it is costing him and what he is to gain by it.

Methods That Bring Success

The foregoing observations summarize the ideas and practices that have brought success to John M. Voss, President of the Triangle Construction Co., of Yonkers, N. Y. Fifteen years ago he was a carpenter working for his weekly wage. He learned his trade with a Westchester firm that did much local building until they went out of business. He went with other builders and finally specialized on stair building. He was a good stair builder, but, because he was not content to stay at that, is one reason why he is widely known today as a successful school builder. Another reason was that there came a time, in 1909, when the builder he was working for had no stairbuilding to do!

Mr. John M. Voss

So what did young Voss do? Having taken his tool kit and put it away in the closet under the back stairs, did he then go down town, there, on the most prominent street corner, to discuss the high cost of living and talk hard things against the Government? No. But he did go about knocking from door to door and obtaining alteration jobs. He re-shuttered some houses, built a fence or two, repaired a roof here, rehung a door there or had a pair of steps to build elsewhere. In a manufacturing suburb a dozen years ago there were many home owners that wanted something done in the garden or about the house. Some of the jobs were on the spot, some shop jobs, and most of them, of course, a combination of shop and spot.

Now at this time young Voss did not have a shop. Did he sit down and worry about that? Did he let it stop him from taking on repair or alteration work that required a certain amount of bench work? Did he let the lack of a shop stop him? Not for a minute. It is really a pity that the "holdback" class of persons could not have heard Mr. Voss tell how and where he started his first shop. It is a straight and valuable pointer to the other young men who wish to make a place for themselves in the building industry. His words were few and simple.

A Shop in the Cellar

"I went about knocking from door to door obtaining repair work and alteration jobs. Then I rigged up a bench in my father-in-law's cellar and worked there by gas-light on the lumber, lay-outs and so forth."

It was not long thereafter until he was proprietor of a small shop down by the docks. That was twelve years ago. After the jobbing had been followed awhile he branched out into sub-contracting. It is not well for a young builder to be satisfied only with alteration and small jobbing work that can always be found in any community.

The Foundation for Broader Business

Mr. Voss says "The jobber and repairer who is doing all right is apt to let his business become localized. This is all right for a time but when a builder gets outside of the home community he is broadening individually and laying the foundation for a broader business."

"Things went along steadily. I had a loss now and then but I had schooled myself in estimating by taking daily notes on the work I am doing and the items of materials that passed through our hands."

"When I had a $5,000 year in those days I thought I had a big year, but I wasn't going to be limited. It became more in succeeding years, first a $100,000 year and then running to $500,000 and I know I am going to have a $1,000,000 year before long. I do not think of this now as any bigber than the $5,000 year seemed to me a few years ago."

Don't Be Afraid

"The young builder that starts out for himself should be unafraid. That is the first big point, the other element of success is to be persevering, systematic and SPECIALIZE." There is satisfaction in every job that is finished right and on time. You can leave your customer at its finish with a handshake because he is satisfied with the work that you have done."

If it is necessary to stop and make sure for fear of making a mistake, there is a reason for such hesitation —such as inadequate preparation or lack of mechanical equipment and consequently there is more than the usual liability of making a mistake. Courage increases with the bettering of a man's organization.

Be Observing, Make Notes

The young builder is wise who makes use of his powers of observation in the working days passed with his own tool kit in hand. If one is systematic as well as wise he jots down little things in a note book. He puts down how much sash cord it takes per window of each size, how many feet of flooring can be laid per day, how many windows or doors fitted, etc. Mr. Voss did this; he also studied, taking courses by mail and read the trade papers closely, including the BUILDING AGE and received valuable help therefrom.

The data taken from the little note books on the jobs becomes especially valuable later in estimating the costs of the buildings he will erect at a profit.

Have Your Men Specialize

Mr. Voss is also convinced by early observations, confirmed by later experiences, that it is best not to let one do a part in every operation. Building becomes more highly specialized every day and the contractor who lines up with the tendency is in the better position than the one who fights it. Wherever possible—and it is worth while planning carefully to make it possible—one attends to the floor, carry or lay, one hangs doors, one is on all sash, one all trim. Each carries a box of tools filled up. The specialized prices on a big operation are made possible mostly by specialized arrangements of the specified operations, or, in other words, routing the worker.

Organize

The first feature in assuring a young builder's success for himself, according to Mr. Voss, was "All in the organization." The growing, advancing, succeeding organization of this class has its own cement mixers, concrete crew, its own framers, trimmers, brick layers, roofers, finishers. The main reason for this consists in the saving of time for the direct, primary purpose of finishing one portion of the work after another on time. Speaking of this feature from his own experiences Mr. Voss said the exasperations of delays furnished the main reason for his escaping from the sub-contractor stage of his progress as quickly as he could. "In a complete organization," he put it briefly, "Wednesday means Wednesday—not Wednesday or Thursday or Friday." As methodically as rapidly-moving operations must be maintained now, a sub-contractor's failure to arrive and deliver is as fatal to the chances of profit on a job as the tardiness of Grouchy was to Napoleon at Waterloo. So a special advice to the young builder is to make his period of sub-contracting as short as it can be made without crimping his necessary knowledge that he will need for the work higher up.

No Working with Tools Yourself

The young builder who so recently had the tools in his hands himself is frequently seized with an impulse to jump in and do the work himself. This is especially the case when settings or trim are going badly, or are not up to his own personal standards of craftsmanship. "Keep back and direct the work," Mr. Voss advises. Builders who go out on the frame and work themselves with the tools are conspicuous among those who fail. The work can be brought up to standard by direction, and more profit shown by intelligent and insistent supervision than by taking tools in hand personally, because when the overseer dilutes his management by wielding tools and materials along with the crew, the gains in one direction are not enough to offset the losses in others. Besides, the details of management set him a big task in themselves.

Analysis

No contract can be analyzed too much. In the execution of a contract the most important point is to see the thing—a saving, a better method, the best choice of material—and make the saving. This must be done *before,* not *afterward.* This feature of contracting has a direct money return, and it supplies as well the real joy of building. "I had rather do a quarter of a million and analyze properly than do two millions a year and not analyze. By proper analysis of a contract I mean to see its possibilities, its savings, its satisfactions. This applies to sub-contracts, too. Rather than give them out without going carefully over them, I would be inclined to risk and suffer a time forfeit for I am sure the profits of my $500,000 worth of work, with all contracts properly analyzed, with the work and buying laid out accordingly, are at least equal to, and are also quite likely to be greater than the profits of the man who has the two million dollars worth and has wastage in energy and money. Besides that, he has in the execution four times the amount of worry, with only one-fourth the amount of money profit."

Attention to Buying

"A great secret in profitable building construction is in the buying end. We give great attention to the office end and are often able, by direction in closing contracts or the buying of materials, to save thousands of dollars in a week's time that it would take months of time on the work to accomplish the equivalent—that is what would make an equivalent showing in dollars and cents. Plainly speaking, one must be a good buyer to get the most out of a contract."

Analysis Applied to a Job

In line with these observations here is how Mr. Voss applied them on a recent contract for a school at Bristol, Conn., this was a two story structure 153 feet by 88 feet, of brick, stone and concrete construction. The site is a big farm lot, and on looking the ground over carefully it was found to be favored with a higher level in the rear, giving the builders an advantage of 12 feet and making it practically one story less in the rear. It was soon decided to build a runway from the rear, as being a very feasible and advantageous way of delivering materials on the work. This runway is made with a floor of 2″ planking laid on a cross braced trestling made of 3″x4″ timbers. The expedient of a runway obviated the conveying of a steam hoist and equipment the matter of more than 100 miles, its erection and the rehaulage when the work was completed. A steam hoist, besides its overland travelling expenses, would be a continuous item on the cost sheet. In the first place it would require the services of an engineer at a steady wage, whose board of $60 to $70 a month would also have to be paid. Coal, then very expensive, and hard to get, would have to be burned, and that was quite an item.

Does It Pay to Use a Hoist on a Short Lift?

The first objection was the great distance the hoisting equipment and boiler must be hauled; the elevator's travelling in the perpendicular shaft meant steady costs was a second objection. On the other hand when a rainy day occurred the overhead on a runway was nothing. On a boiler overhead would remain. Though the fire might be banked, some coal must be burned and the man must be paid. With the runway adopted there was a saving of $700 to $800 on this item alone. Had the building been three or four stories high, a steam hoist would have been absolutely necessary, Had it been in a city, in a built in section where space is scarce, a hoist would be necessary. "It pays to see the thing *before*, not *afterward*."

That little old-time note-book in the contractor's pocket said in one well-thumbed page that "a hoist with a short lift cannot pay its own travelling expenses."

The Use of a Runway Instead of a Hoist

The runway which was not quite 100 feet long was more economical not only for rolling barrows of material, but also as a walk for the men to carry timbers, forms, reinforcement iron, window frames and short pieces of steel. In this connection a special buying feature was looked out for in advance by the procurement of stone and sand from quarries only seven miles distant. These materials were brought in trucks to the runway. Materials, frames, etc., were brought to the top floor by a second runway, erected later at the west end of the building. Then, the timbers of the runways when taken down are used for scaffolding and other purposes.

> "THE poorest way to finish a job is to finish it in the courts," says Mr. Voss. "I aim to give satisfaction and a hand shake at the end. Those who have charge of the building of schools are high grade business men, and to give them satisfaction is to get a favorable name in the commnuity. A good reputation is a constant asset."

Reports of the Work

The daily reports of work are invaluable to the master builder. By careful analysis the weak points in the progress of the work are discovered, with the result that by new directions in placing men and materials more work will be done. The fore part of this year gains were recorded in the number of brick laid per day, a favorable condition that the daily work sheet showed at once. The items, of course, differ almost daily, and when these are supplemented by the superintendent's monthly report a complete grasp of the situation is in the master builder's hands all the time. The headings of March 30, on the Bristol school operation, lists the following, with hours and costs: Supervision, laying brick, setting stone, tending mason, concrete, moving window frames, picking up excess, hoisting ornamental stone, staging, footings, derrick, screening sand, cleaning up rubbish.

Besides daily reports a monthly report is furnished by the superintendent of which the following is a copy on the Bristol School job:

"We have laid to date 383,000 common brick, for the month 99,000 common brick. Two-thirds of the interior face brick have been laid. Erected approximately one-half of structural steel and have erected 65,000 pounds. Have erected 100 per cent. of pans and forms for concrete floors. Have put in approximately 180 yards of reinforced concrete to date. Approximately 30 tons, or 75 per cent. of reinforcing steel in place. Electrical work, approximately 4-9 of conduit pipe and outlet boxes in place. Steam fitters, approximately one-half of pipes and fittings (no radiators) on site. No pipe installed; perhaps 80 hours of labor at most; storing materials inside building and cutting out and placing sleeves and inserts. Plumbers installing drain pipe above first floor level to fountains on first and second floors. Fountains 15 hours. Cutting out sleeves for water pipes in basement to toilet, locker and basement rooms, approximately 30 hours. Forms in basement removed with exception of visitors gallery and gymnasium. Please inform us how many feet of 3″x4″ spruce was in car. Please furnish us with weight of last car of crushed stone. Overdrew $1.10 on pay-roll week ending Dec. 3. Enclosed please find list of material received to date."

Head of Active Corporation

Mr. Voss is now president of the Triangle Construction Company, incorporated about three years ago. His work list has on it schools—and more schools. Browns' Letters recently listed the following in Westchester and adjoining counties, as recently completed or under construction. School No. 13, Yonkers, N. Y., cost $300,000, architect C. Howard Chamberlain, just completed. School at Bristol, Conn., $285,000, architect Wilson Potter. School, Beacon, N. Y., $85,000, architect, Rasmussen & Wayland. School No. 23, Yonkers, N. Y., architect, C. Howard Chamberlain, cost $104,000. Recently completed High School at New Rochelle, N. Y., $210,000, architect, Edgar Joslyn. School South Amboy, N. J., $112,000, architects, Lowenson & Schubert. School Pawling, N. Y., $52,000, architect, Alfred Hopkins. School North White Plains, private plans. Garage, O'Brien Bros., New Rochelle, N. Y., Child and Ferrischild, architects. Garage at Yonkers, N. Y., for N. Branchu, George Rayner & Sons, architects. Troco Nut Butter factory, Pawling, N. Y.

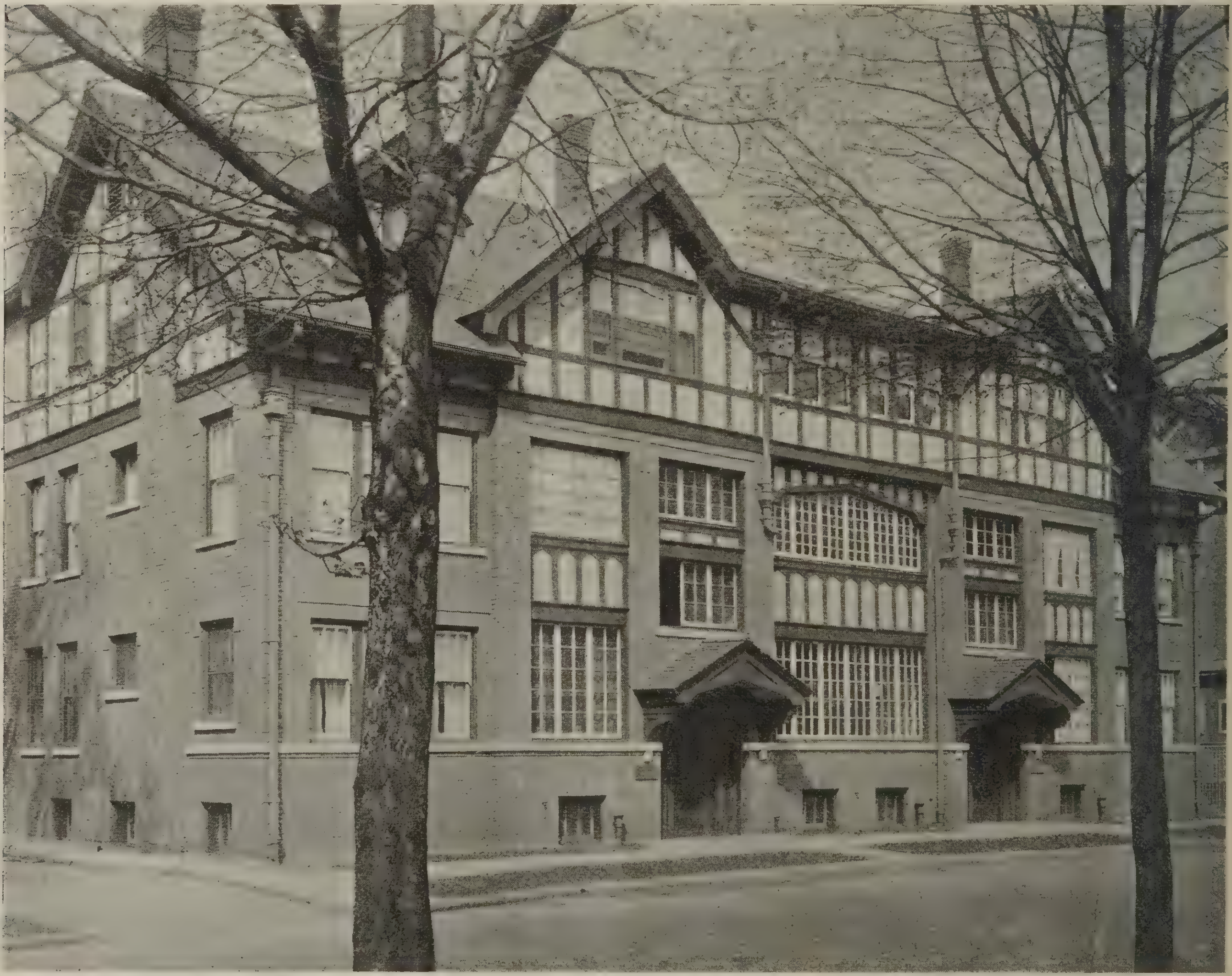
Twelve-Family Dwelling with Unusual Exterior

Artistic English Design of the Plymouth Apartments, Erie, Pa.

AN apartment house is usually the bugbear of an architect's office, and their looks usually condemn them in the public eye.

Messrs. Shutts & Morrison have designed one at Erie, Pa., which overcomes a great many of the prejudices against apartments. Instead of a boxy, stuffy building full of light shafts and dark halls, they have designed quite a domestic-looking and attractive building, which was erected in 1918, in the heart of the residence district of Erie, Pa. The lot is an interior one, only 82½ ft. square. The architects have provided a total of 12 apartments, 3 each on the first and second floors, and 6 small ones on the third floor. Each apartment has access to both front and rear halls, which are well-lighted. By the introduction of open light courts, every room has outside light and ventilation. The roof is of slate on the front of the building, and composition on the flat portions in the rear. The apartments are divided by masonry fire walls and have roomy stairs both front and rear.

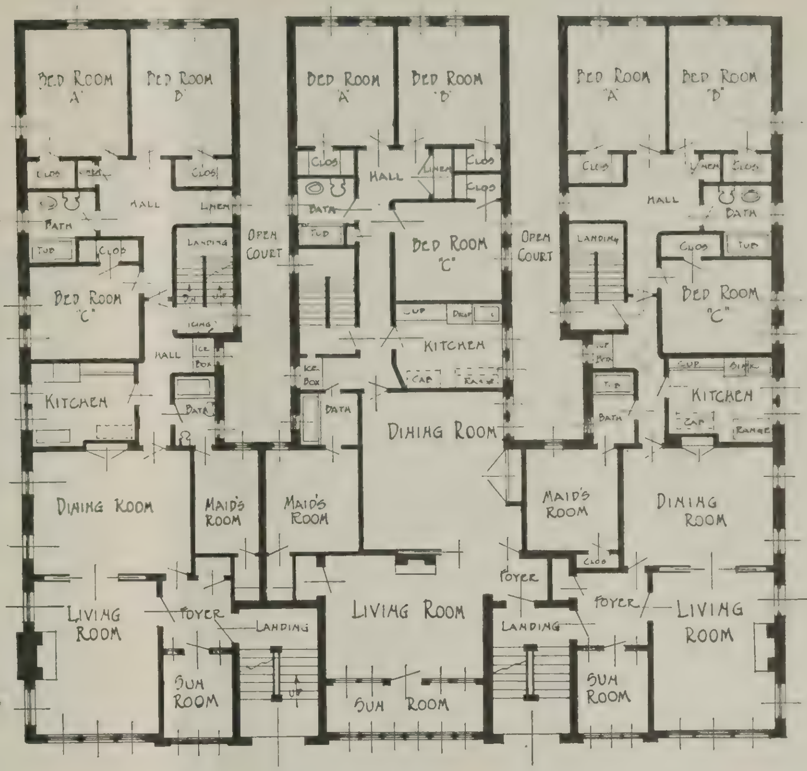
The first and second floor apartments, as shown, include a living-room with sun-porch, dining-room, kitchen, maid's bed-room and bath, and three other bed-rooms with bath. Front entrance halls have tile floors, marble-wainscot, and brick stairs of attractive design. The entire building inside, including kitchens, is finished in white enamel with birch doors. Heating is by vapor steam from the plant of the Erie Lighting Co. The plumbing includes the latest ideas, such as built-in bath-tubs, with tile walls, built-in accessories, such as soap dishes, towel bars, etc. The third floor apartments have a combination sink and laundry tray. Each of the large apartments has a spacious cellar equipped with laundry trays, clothes driers, etc. Design of the exterior is English with a Tudor feeling. Woodwork is finished in dark chestnut brown with white stucco panels. Brownish red brick was used for the first and second stories. General contract, Kirschner Bros., $40,000.00; Heating, Gannon & Carey, $5,175.00; Plumbing, Frank J. Butler, $4,000.00.



THE small cities of the United States are gradually adopting the modern apartment house.

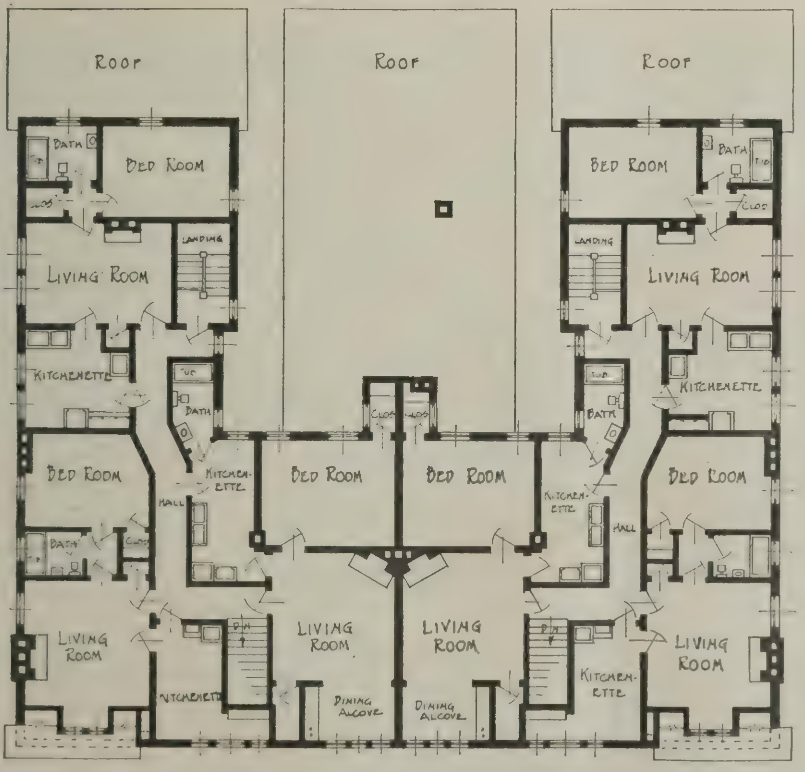
This fact was revealed in a report on building operations in this country in 1920 issued recently by the Civic Development Department of the Chamber of Commerce of the United States. This report, which was compiled by the National Chamber in conjunction with the Federal Bureau of Labor Statistics, is one of the most complete of its kind ever prepared, and contains definite data on the amount of building construction carried on in the United States last year.

The building figures show that in 1920 70 per cent. of the families provided for got one-family dwellings; 11 per cent. two-family dwellings and 19 per cent. apartments in a multi-family dwelling. According to the report, the figures also indicate that the proportion of multi-family dwellings that were provided last year was largest in the small cities which have not had as much experience with this type of habitation as the larger cities. At the same time the report shows that there was more house building in proporion to population in the smaller than in the larger cities. The new accommodations—house or apartment—provided in cities of 25,000 to 100,000 population was one for every 258 inhabitants, while in cities of more than a million population it was one for every 591 inhabitants, and the average for all the cities listed was one for every 350 inhabitants,



. . FIRST . & . SECOND . FLOOR . PLAN . .

. SCALE . 0 2 4 6 8 10 FT. .



. . THIRD . FLOOR . & . ROOF . PLAN . .

. SCALE . 0 2 4 6 8 10 FT. .

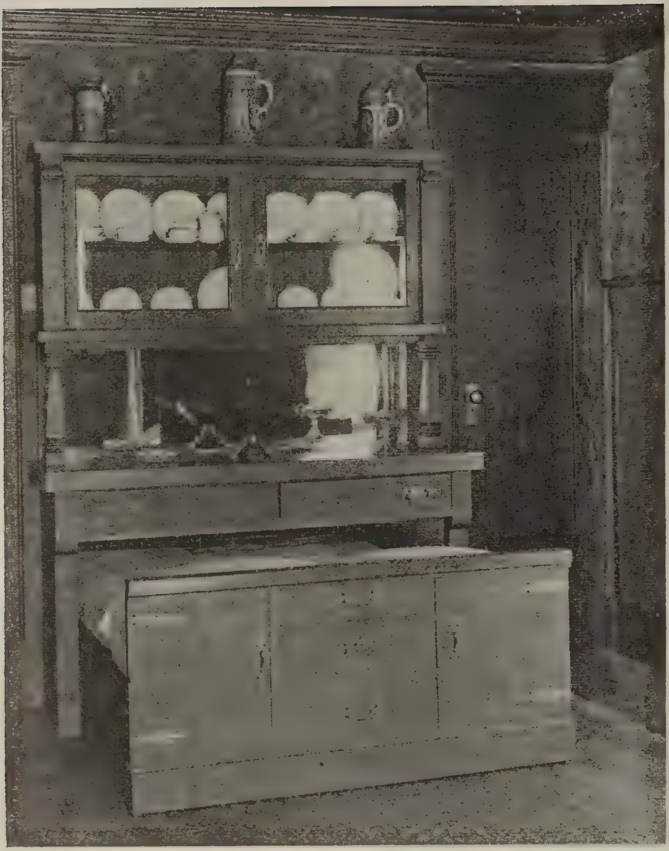
It is shown that 1920 was the record year for sale of bathroom equipment, despite the small amount of new residence building. A great deal of this equipment was used in the conversion of one-family dwellings into tenement houses. The economic and social significance of these alterations, the report says, is of first importance.

A blank soliciting the required building information was sent out to the 288 cities in the country having a population of 25,000 or over. Their total population was nearly 38 million. Of these, 131 cities, with a population of 81.5 per cent. of the total, reported.

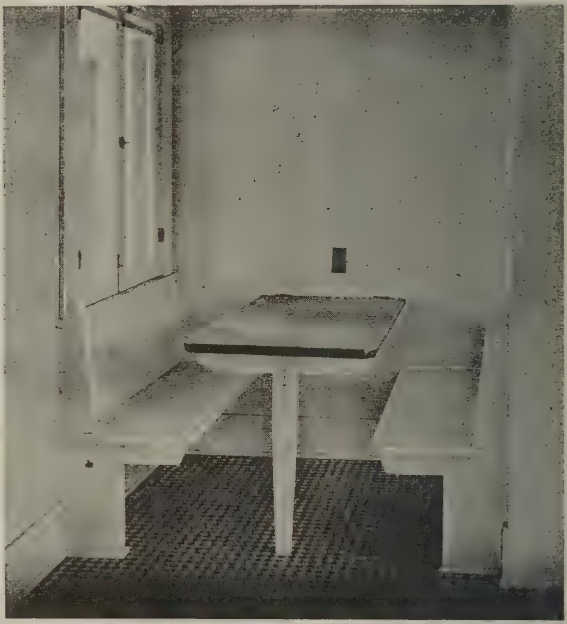
The modern apartment dwelling is becoming more popular every day because it gives the maximum comfort at small expense.

Built-in Features

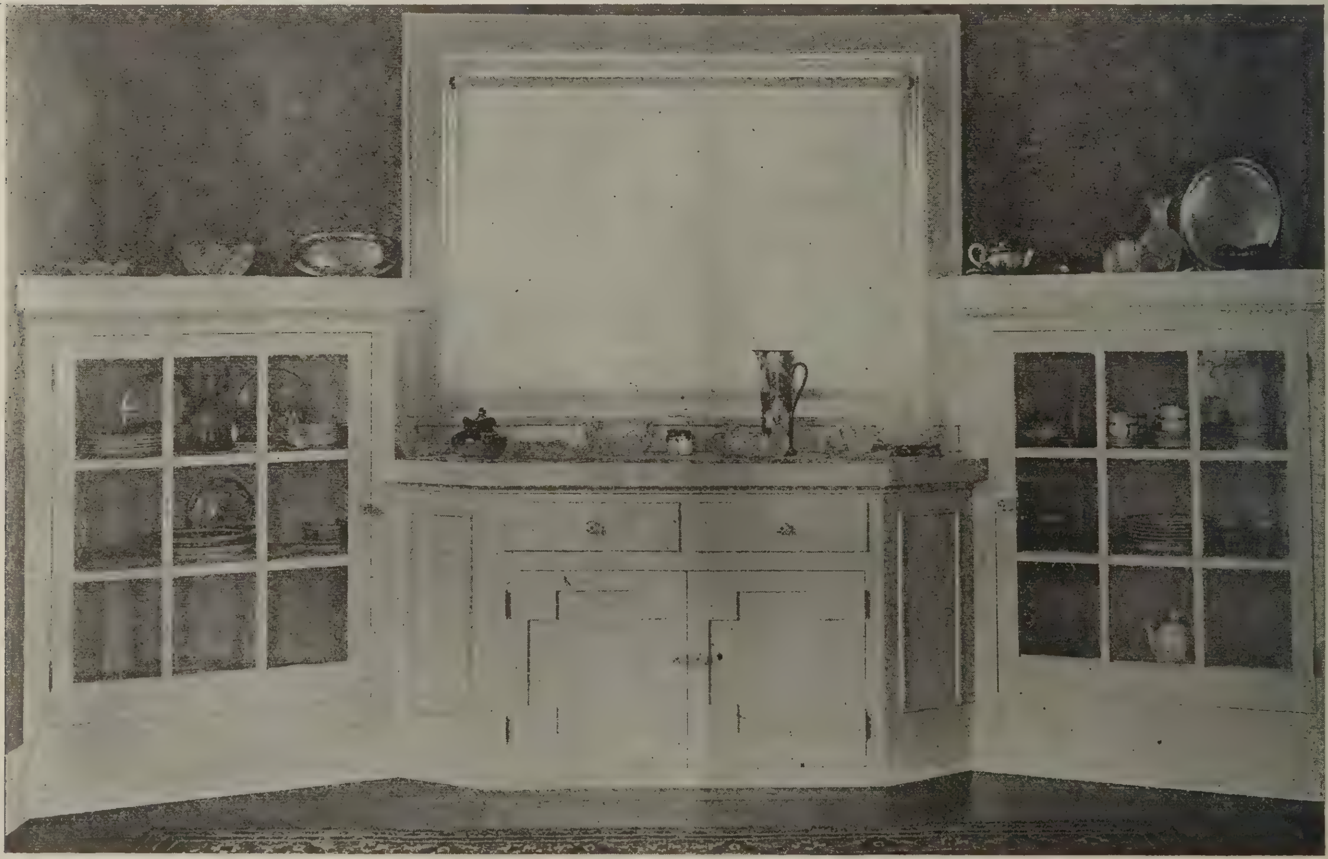
Some Practical, Space-Saving
in Remodeled as well



A Bed Camouflaged As a Sideboard Base Saves An Extra Room



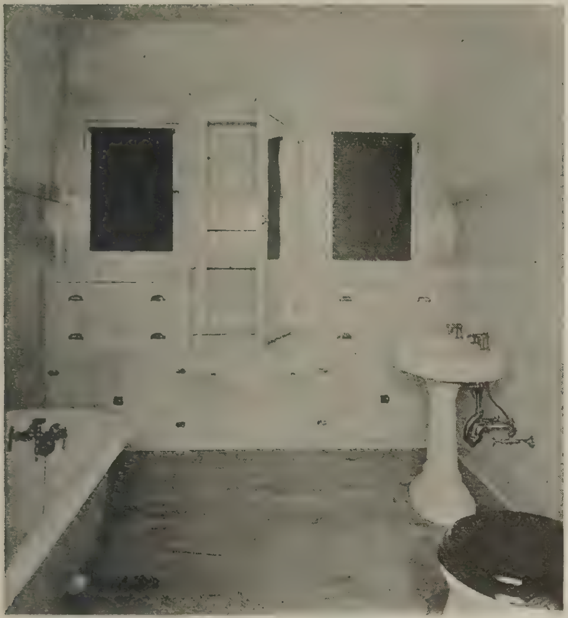
An Easily Made Breakfast Nook Saves Many Steps



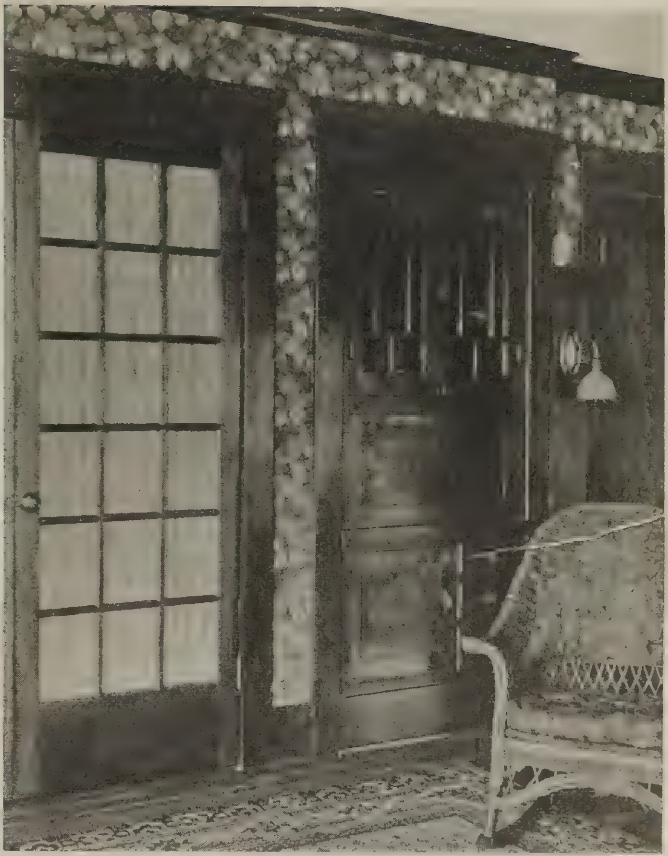
An Attractive Arrangement of Sideboard and China Closets

for Modern Homes

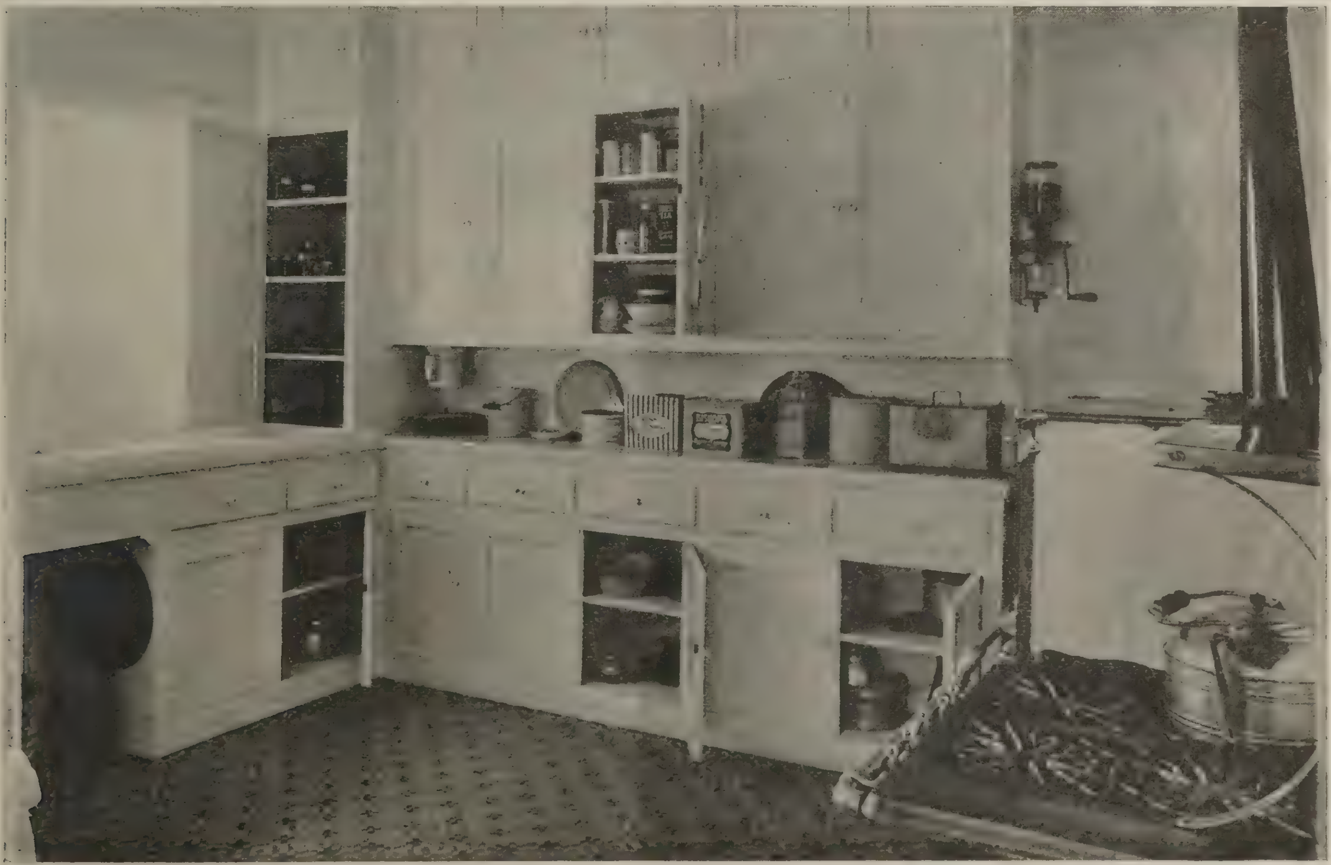
Ideas that can be Introduced
as in New Homes



Handy Bathroom Closets for Medicines and Linen



Built-In Desk in Living Room Saves Room



Kitchen Cupboards Like This Are Desired by Modern Housewives

How to Frame a Curved Rafter Roof

By RICHARD M. VAN GAASBEEK
School of Science and Technology, Pratt Institute, Brooklyn, N. Y.

A CURVED rafter roof is a moulded or curved roof such as an "ogee" roof over a bay window, a curved tower roof, gothic roof or circular dome, etc. The profile of a section of the roof surface determines the profile or curve to which the top edge of the common rafters are shaped. The curve of the hip rafter is entirely different and must be developed from the curve of the common rafters, in order to bring the center line of the hip in alinement with the top edge of the common and jack rafters. The run of the hip is longer than the run of the common rafters, but the total rise of both rafters is the same because they terminate at the apex, or in other words, the profile of the hip is an elongated profile of the common rafters. This introduces an important problem in the development of curved surfaces and offers an excellent study in picking up lines and bevels from the plan where the hips do not cross the plate at an angle of 45 degrees.

The following description is given of the curved rafter roof problem developed in the Carpenter Shop of Pratt Institute, Brooklyn, N. Y., for the purpose of demonstrating to trade classes the principles involved in framing a curved surface roof. It affords an opportunity for individual study that would not be possible if full sized timbers were used. In preparing a specifications of suitable sized stock that were used in framing the problem, the writer urges the reader to lay out and construct the roof for it is only by actually framing a roof that a clear understanding of the principles involved can be solved and mastered.

SPECIFICATIONS:

Plate ⅞″ x 2″
Hip Rafters ¾″ x 3″
Common and Jack Rafters ⅜″x 3″
Total rise 15″
Dimensions (see plan, figure 1)
Rafters spaced 2″ on centers.

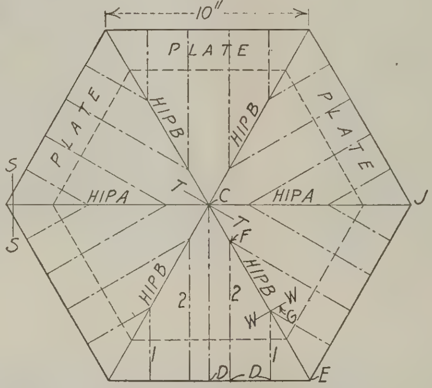


Fig. 1—Plan of curved rafter roof from which the working lay-out is made

LAY-OUT: Lay the plan out full size on a sheet of detail paper or a board. A simple way to lay out the hexagonal plate is shown in figure 1. The length of a side of hexagon is equal to the radius of a circle. From a center line and with a radius of 10″, the width of a side of the hexagon, scribe a circle. Use the point where the center line crosses the circle as a center as at J and with a pair of dividers or trammel points set to the radius of the circle, arc the circle on either side of the center line as at E, figure 1. Connect the points as shown making a true hexagon. Connect the points of the hexagon showing the center lines of the hip rafters and draw in the jack rafters spaced 2″ on centers as shown.

The hexagonal plate may also be laid out with the steel square. Draw a center line and place 16⅝″ on the blade and 9⅝″ on the tongue on the center line. Mark on the tongue for the angle of the hexagon.

A graphic section of the common rafter must next be laid out as shown in figure 2, from which the hip rafter can be developed. Draw a base line and from the center draw a perpendicular line. On the base line from the center point C lay off the run (8⅝″) of the comon rafter C-D, figure 1, as at D, figure 2. (Note) Common rafters are not required in the framing of the roof. The jack rafters are a part of a common rafter so that it is necessary to make a complete section of the outer curve of the roof. This can only be developed on what would be the line of a common rafter. From the center C on the perpendicular line lay off the total height (15″) given in the specifications as at T. Rather than bring the rafters to a feather edge at the extreme top, the apex is cut off level 3¾″ from the extreme point and a finial worked out of solid stock continues the lines of the rafters to give a finish. The top of the finial is a circle ¼″ radius. Measure down on the center line from T and with this point and the dividers set to ¼″ radius, scribe the circle, and locating the point W, figure 2. Connect W and D with a light construction line. With C as a center and a radius C-D, the run of the common rafter, scribe a circle until it intersect the diagonal construction line as at X. With X

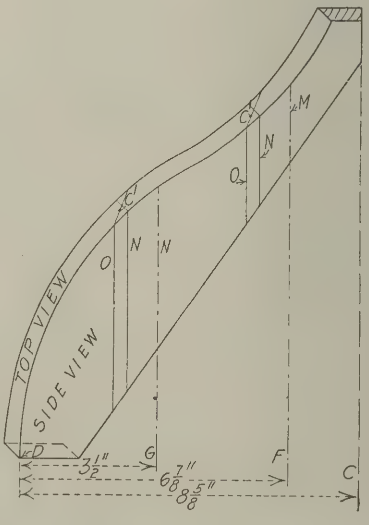


Fig. 2—The common rafter developed on the plan from which the profile of the hip rafter is developed

as a center and the same radius scribe an arc as at Y. With W as a center and the same radius cut the arc, locating the exact point Y. With Y as a center still using the same radius complete the ogee curve or the outer profile of the comon rafter. Measure down on the center line from the joint of the finial 1″ as at H. Measure in on the base line from the edge of the rafter D, 1¼″, as at I. Connect the point H and I for the back edge of the common rafter. These are not fixed measurements, but a matter left to the individual judgment of the framer. Care should be taken not to make the rafter weak at its narrowest point nor excessive at the widest point. The widths of timber available may be a determining factor in laying out.

TO DEVELOP PROFILE OF HIP RAFTER FROM PROFILE OF COMMON RAFTER:

Measure the run of the hip rafter C-E, figure 1. Produce a perpendicular line from the outside edge of the common rafter, figure 2 as at D of indefinite length. From the center point C produce the base line of the hip rafter 10″ long, C to E intersecting the perpendicular line as at E. If laid out accurately the distance D-E should be equal to one half the side of the hexagon or 5″. Divide the base line of the common rafter, figure 2, into any number of parts. The closer these lines are, especially in sharp sweeps, the truer will be the curve when transferred to the stock to be used in framing the roof, as the points on the profile will be closer and the profile easier to pen in. In this particular problem it is divided into 12 parts numbered 3-4-5-6-7-8-9-10-11-12 and 13. Parallel to the center line draw in construction lines extending from the base line to the top edge of the profile of the common rafter and extending down until they intersect the base line of the hip rafter. From the base line of the hip at right angles continue these lines of indefinite length, also the center line radiating from the center point C. Number the lines for identification to correspond to the lines on the common rafter. On the center line C point off the distance C to the joint of the finial on the common rafter. Measure the distance on each line from the base line to the top edge of the common rafter and point off these respective distances on the corresponding lines on the hip rafter. That is, the distance 13-13, 12-12, etc. on the hip rafter are equal to the distances 13-13, 12-12, etc. on the common rafter, figure 2. This gives a series of point on these construction lines on the hip rafter through which the profile of the hip rafter can be drawn. Measure down on the center line of the hip rafter from the joint of the finial 1″, the same distance as the common rafter. Project the bottom edge of the back of the common rafter as at I down to the base line of the hip. Conect I and H, giving the back edge of the hip that will line up with the back edge of the common rafter.

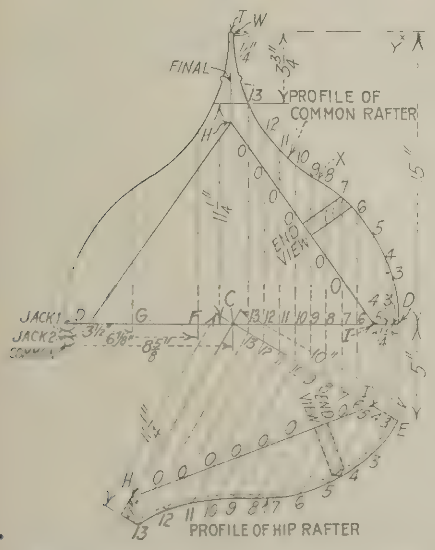


Fig. 3—Developed length of hip rafters, showing method of transferring lines from lay-out to the rafter stock

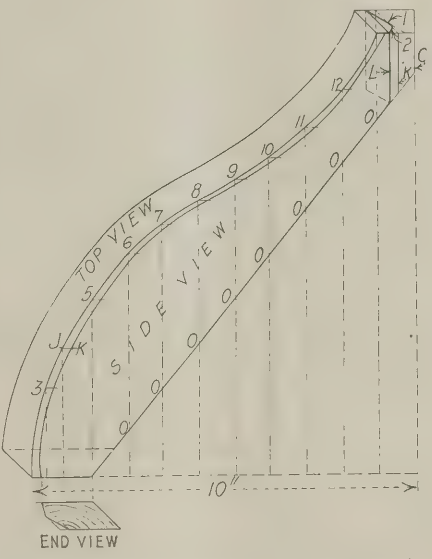


Fig. 5—Developed length of back rafters

TO TRANSFER THE LINES ON THE LAY-OUT TO THE RAFTER STOCK:

Joint one edge of the stock, using it for the back edge, and work from this edge instead of from the top edge as in laying out a straight roof. Measure the various distances on the lay out on the line of the back edge of the rafter formed by the intersection of the plumb construction lines, and lay off these same distances on the side of the stock to be used, marking along the jointed edge. Set a bevel square on the lay-out to the bevel formed by the plumb construction lines and the back edge, giving the plumb lines. Place the bevel against the back edge of the stock and at each one of the distances previously measured off, produce a plumb line. Number to correspond to the lay out for identification purposes. Measure the distances on the lay-out from the back edge to the top edge of the rafter 0-3, 0-4, 0-5, 0-6, 0-7, 0-8, 0-9, 0-10, 0-11, 0-12 and 0-13. Transfer these same distances on the respective lines on the stock, measuring from the back edge. Drive a small nail in at the points thus obtained, bend a thin batten around them and pen in the profile or top edge of the rafter. The method of picking up the lines is the same for both the common and hip rafters, see figure 3.

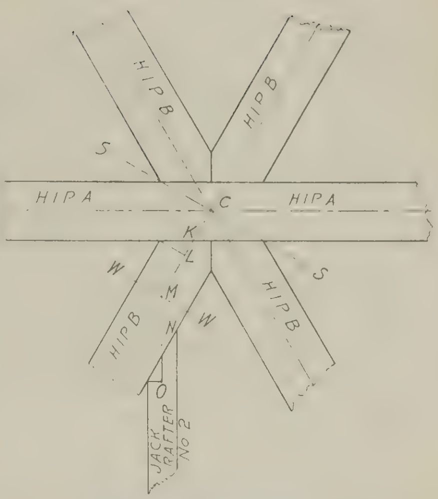


Fig. 6—Enlarged section through S-S, Fig. 1, showing intersection of hip rafters. Enlarged section through W-W, Fig. 1, showing intersection of hip and jack rafters

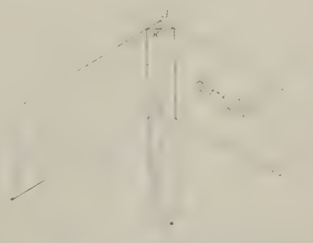


Fig. 4—Enlarged section of corner of hexagon plate at S-S, Fig. 1, showing the amount of backing for the hip rafters

TO BACK THE HIP RAFTER: Lay in a section of the hip, full size as shown in figure 4, which is an enlarged section of the corner of the hexagon plate, S-S, figure 1. Where the outside edges of the hip intersect the plate, square a line across as at K figure 4. To determine the amount of stock to be removed in beveling the corners to bring the center line of the hip alinement with the top edge of the common rafters, produce a level line at each one of the points formed by the intersection of the top edge of the hip and the plumb construction lines as at J, figure 3. Measure the distance on the center line of the hip rafter J-K, figure 4. Measure in on each one of the level lines from the top edge of the rafter this distance. This gives another series of points J-K, figure 3, into which a small nail can be driven, a batten bent around and the line of the backing penned in. Notice that this line is not parallel to the top edge and that the backing is greater in some places than in others. This is due to the curve of the roof. Gauge a line through the center of the hip on the top edge. Remove the corner between the backing line and the center line on the top edge. It will be necessary to lay out the plumb and level lines on either side of the rafter, to locate the backing line independently on both sides, due to the fact that the backing line is not parallel to the top edge of the hip rafter.

TO LAY OUT JACK RAFTERS: In this particular roof, a full length common rafter is not used, but it is better to make a pattern of the entire rafter than only to lay out the particular portion needed. The jack rafters are a part of the common rafter. Measure the run of jack rafter 2 on the plan, figure 1, measuring from the wall line to the center line of the hip rafter D-F, likewise measure the run of jack rafter 1, D-G. Measure in on the base line, figure 2, these distances, D-G and D-F, figure 2 equal D-G and D-F, figure 1, at these points produce a plumb line as shown in the enlarged rafter, figure 5. Then the distance D-G 3½" is the length of jack rafter 1 and D-F, 6⅞", is the length of jack rafter 2, on the center lines.

To determine the deduction to be made for the cutting length draw a full size section W-W, figure 1 as shown in figure 6. Lay in the hip and jack rafter full size, measure the distance on the center line, M-N, figure 6 and transfer this distance to the side of the rafter figuer 5, deducting from the extreme length this distance M-N. Square this line across the top edge and point off the center. To determine the bevel or top cut for a fit against the side of the hip square a line across where the outside edge of the jack rafter intersects the outside edge of the hip rafter until it cuts the center line. Measure the distance N-O on the center line, figure 6. Transfer this distance to the side of the jack rafter measuring on a level line from N the distance N-O, figure 5. Connect through center line on the top edge as shown in the top view, figure 5. Cut on the curved line for the top edge on bevel 1 on top edge on plumb line O for the top and side cut against the hip rafter.

TO LAY OUT HIP RAFTER: Transfer the lines of the profile of the hip rafter from the lay-out to the stock. Hip Rafters A form a butt joint as shown in figure 6 an enlarged section through S-S, figure 1. Rafters B must be beveled to make a fit against the sides of Rafters A. Measure the distance on the center line C-K, figure 6 and transfer this measurement on to the side of the rafter, figure 3, measuring in on a level line from C, producing the plumb line K and square this line across the top edge locating the center. Where the outside edges of the hip rafter intersect square a line across cutting the center line as at L, figure 6. Measure the distance L-K, figure 6 and transfer this measurement to the side of the rafter, figure 3, measuring in on a level line from K, producing plumb line L. Square this line across the top edge and connect through the center of line K as shown on the top view. Cut on bevel 1 for fit against hip A. Place the stock of a try square against bevel 1 and square a line from plumb line L, cut on bevel 2 on plumb line L for fit between hip rafters B, cut on the curved line for the top edge.

To assemble roof set up hip rafters A first and then four hip rafters B and lastly the jack rafters spaced 2" on centers. The roof framing will then appear as shown in the picture at the beginning of this article.

Hollow Tile House of English Design

Shown on Opposite Page

Specially Designed for

Readers of

BUILDING AGE

A PLEASING entrance always gives one a favorable impression of our homes, in fact, many pass by where but a few enter in, so our entrance deserves careful attention that it may please the eye of the passerby and extend a hospitable welcome to all who enter.

This modest English house makes an ideal home for the average family. The exterior is pleasing in design and distinctive in character; it would fit well in most any surroundings. The exterior walls are built of hollow tile and stuccoed, sound construction that requires no painting or repairs. The roof is shingle, stained in variegated shades of green, giving a lively contrast with the plain stucco walls.

The plans are well arranged without loss of space, thereby effecting economy in building by giving the most available floor space for the money expended.

On the first floor are a living room, entrance hall, dining room, kitchen and pantry and the required closets, also a large living porch that is arranged for convenient enclosing with sash and screens, and a small rear porch.

A large open fireplace is provided in the living room opposite the entrance from the hall, giving a pleasing impression to one on entering. The kitchen and pantry are completely equipped. An entrance at grade to the inside cellar stairs eliminates the usual outside steps, with a resultant saving in cost.

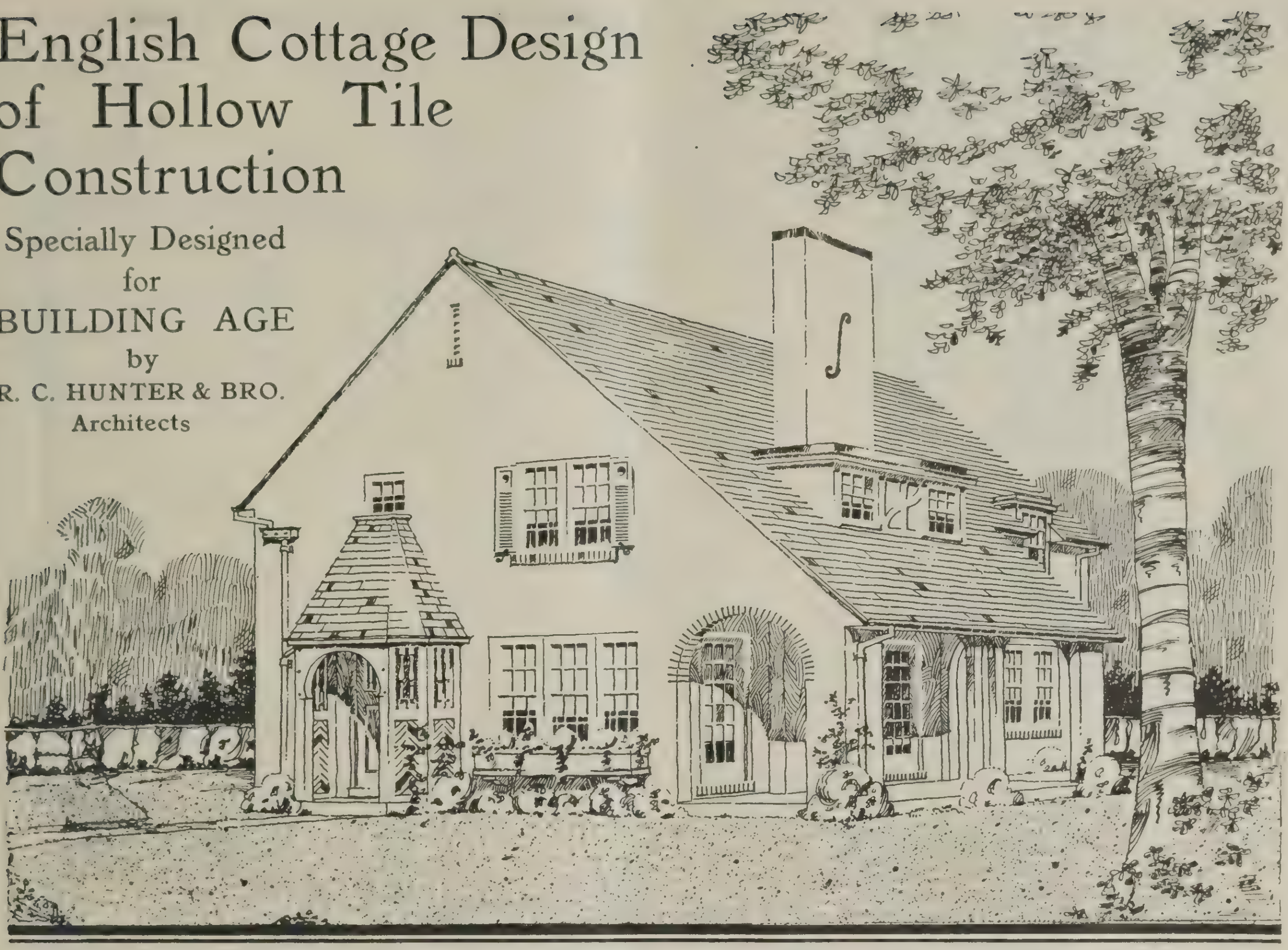
Three bed rooms, a bath and ample closet space are provided on the second floor. All bed rooms have abundant light and cross ventilation.

A cellar is provided under the entire house with laundry, heater, etc.

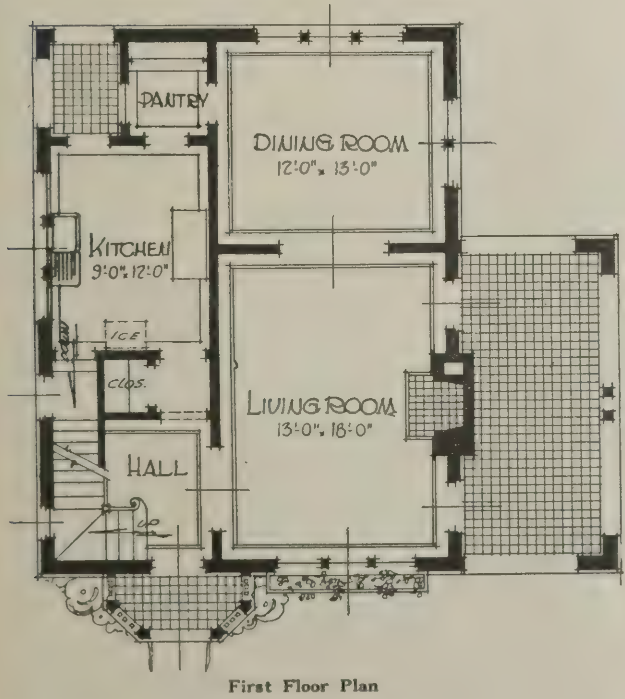
This house would cost to build about $9,700. Complete working plans and specifications of this home will be furnished for a nominal sum.

English Cottage Design of Hollow Tile Construction

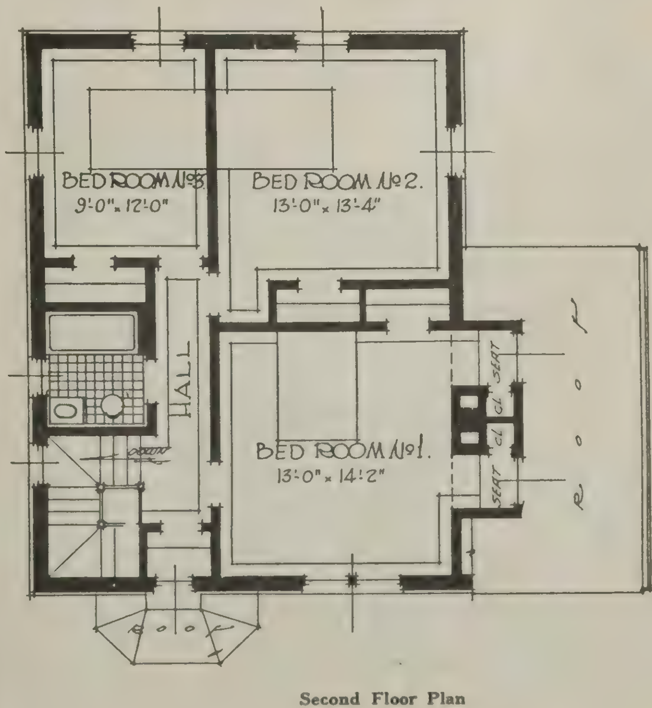
Specially Designed
for
BUILDING AGE
by
R. C. HUNTER & BRO.
Architects



Picturesque Exterior Design Gives Artistic Touch to the Ever Popular Square House Plan With Convenient Arrangement of Rooms Note the "Old English" Details of Front Porch and Dormer. Description on Opposite Page



First Floor Plan



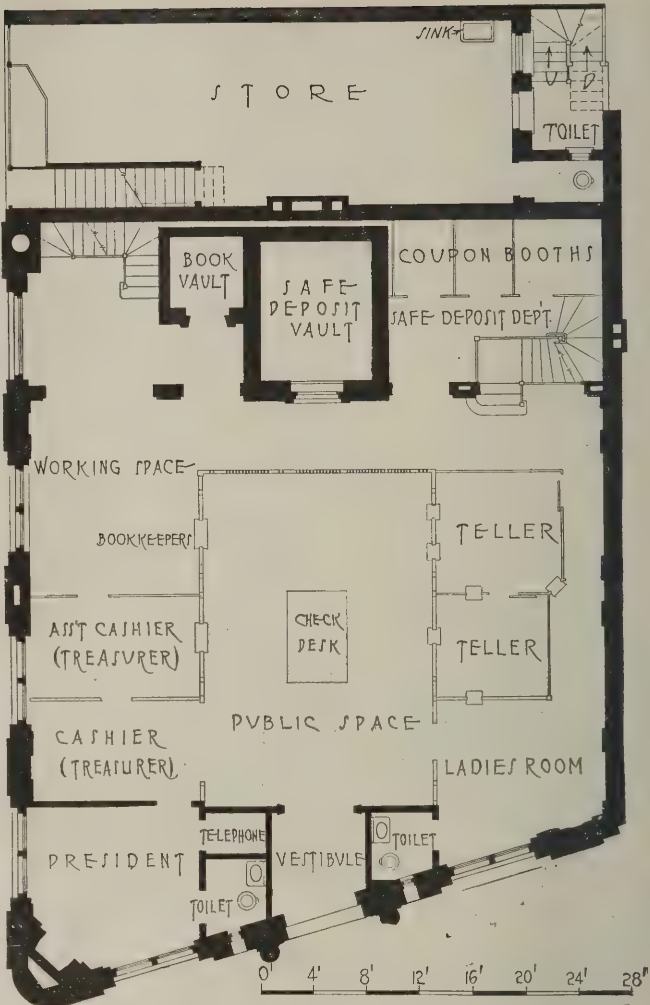
Second Floor Plan

Modern Bank Design

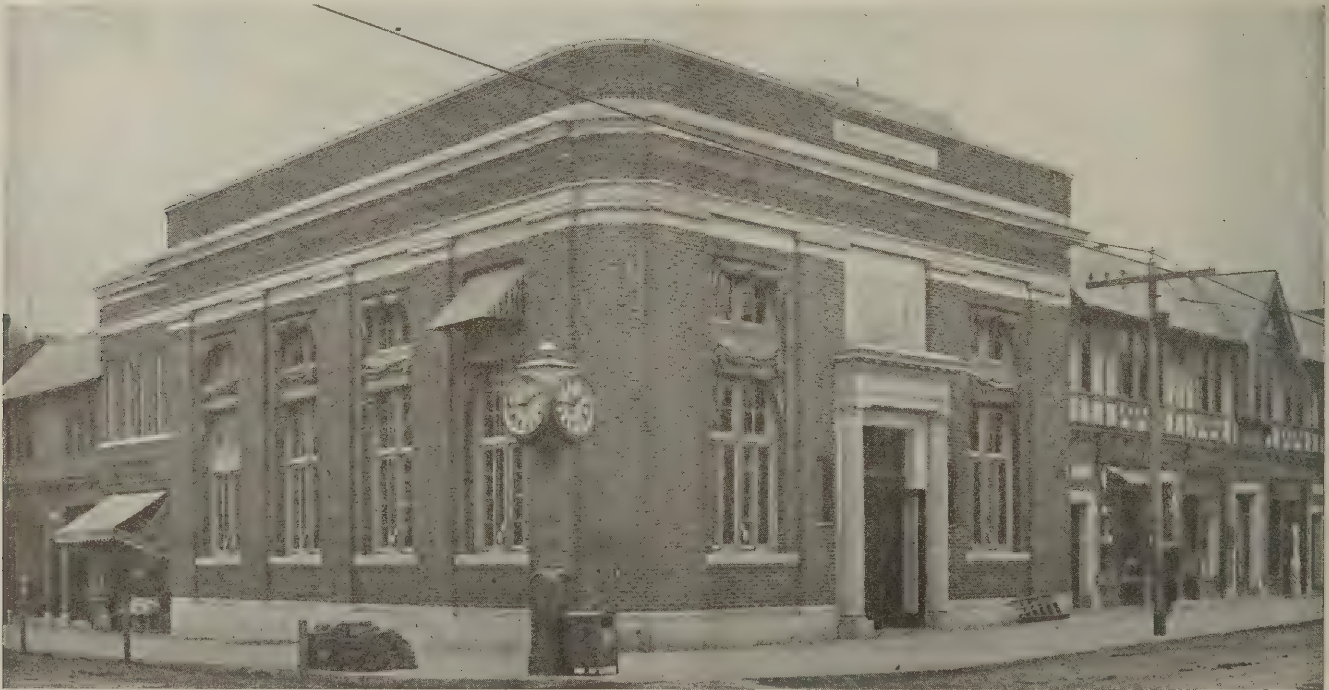
Suitable for a Small City

BANK BUILDINGS must have a solid looking appearance to meet with popular approval. One of the best assets a bank can have is a dignified home of its own. Even in the smaller towns the banks, when erecting a new building, are paying particular attention to have a well-built and designed structure.

The bank building illustrated is the home of the First National Bank at Montclair, N. J. It was erected from plans prepared by Crow, Lewis & Wick, architects, New York.



John J. Lowry, Jr., of New York, was the general contractor and a good deal of credit is due him for the excellent execution of the work.



Financing the Small Building

A Candid Opinion on the Conditions To Day Facing the Prospective Home Owner

By **CHARLES O'CONNOR HENNESSY**

President, The Franklin Society for Home Building and Savings, New York

RESPONDING to the suggestion of BUILDING AGE, and referring to that branch of the construction industries which relates to the building of small dwelling houses, I venture to say:

Nothing is more clear than that while there are a great many things retarding the free operation of the building industry at this time, the chief trouble rests with the inadequacy of credit facilities available to those who want to build houses, and who are able to give reasonable security for mortgage loans.

Speaking in general terms, it may be said that the man of small or moderate means owning a building site, and seeking a mortgage loan to improve it, has no place to go today but to the local building and loan society.

There are now 9,000 of these institutions in the United States, and that they are doing a prodigious work is evidenced by the statistics collected by the United States League of these associations indicating that the loans made by them last year (about $3,000 a loan) aggregated seven hundred million dollars.

Nevertheless the report from these associations in New York, Philadelphia, Chicago and other large centers at this time is to the effect that they are wholly unable to meet all of the demands made upon them by home seekers for mortgage loans. One of the associations in New York City, during the last year, has made loans aggregating nearly two million dollars, most of them for construction purposes.

Therefore it would appear that one of the first things to be done so far as small houses go, is to devise some way to greatly increase the present loanable funds of the building and loan associations of the country.

THE different Building Loan Associations are supporting an amendment to the Federal Rvenue Act to exempt, to the extent of $500, of annual income, the dividends or earnings derived by a person from investments in the shares of domestic building and loan associations operated exclusively for the mutual benefit of their members.

Mr. Hennessy is one of a committee of eight appointed by the United States League of Local Building and Loan Associations, that has submitted to Congress this proposed amendment.

The purpose of the amendment is to encourage greater investments in the shares of the local building and loan societies of the country, in order that these institutions may be enabled to more adequately meet the demands made upon them by members desiring to build or purchase their dwelling houses; and thus, while promoting systematic thrift, to relieve the hardships caused by the housing scarcity, and stimulate the greater employment of labor in the building industries.

BUILDERS should impress on all the merchants of their community to invest their savings in the Local Building Loan Association, as this is the logical way to finance the building of more homes.

The investment pays double interest: on the actual money invested and on the profit of a new permanent customer brought to the town by his home ownership.

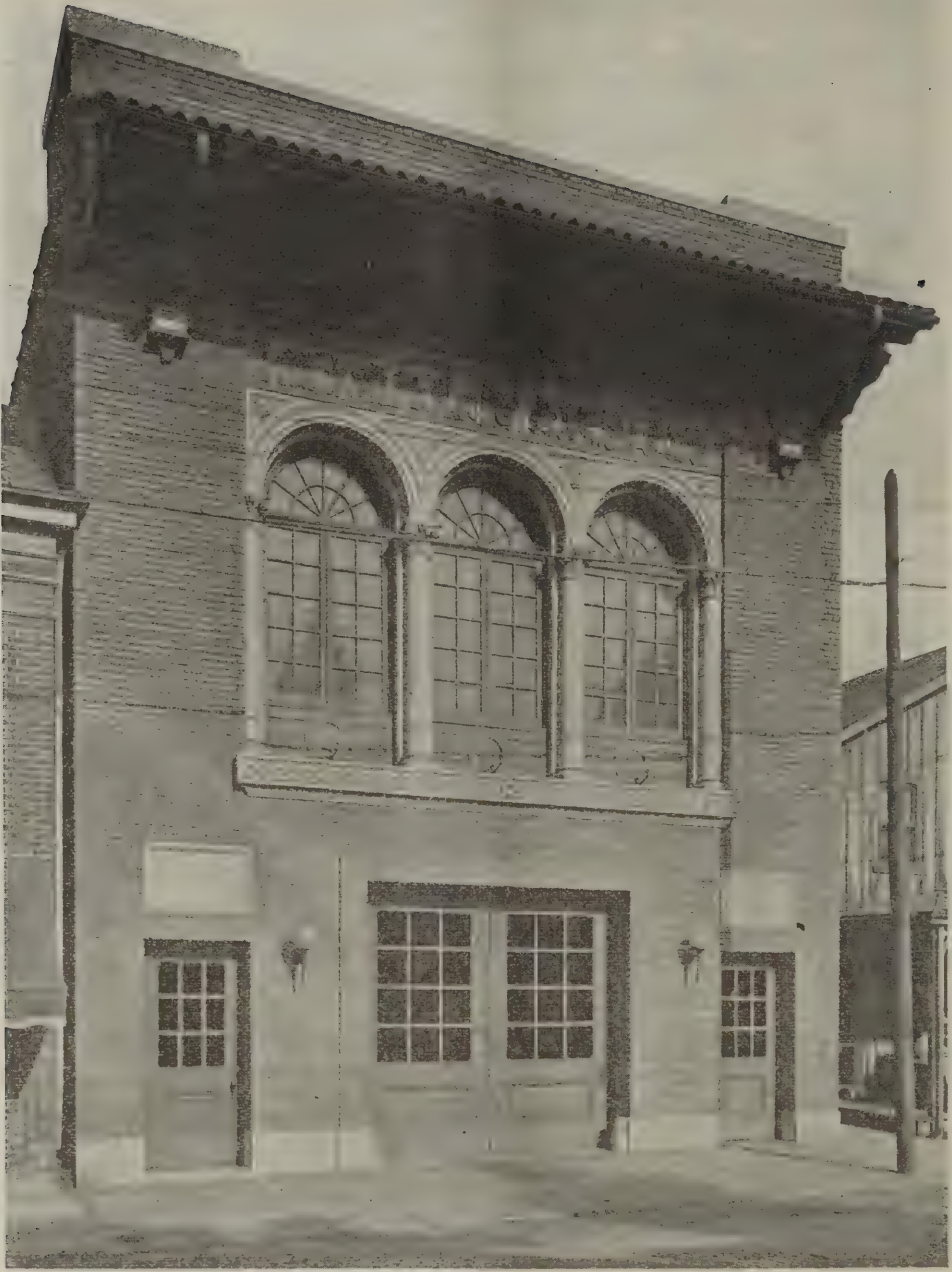
Community action will solve the housing shortage in your town.

MANY a family desires to build a home of their own but are handicapped on how to finance it.

There is a great housing scarcity throughout the country—especially in industrial centers. Because of the detrimental social and economic effect upon citizenship, public health, and industrial stability, the Government should concern itself earnestly in relieving the situation.

The problem of housing relief has many angles, but public as well as private investigation has demonstrated that the chief trouble relates to the financial aspect of it. A tremendous increase in small dwelling house construction would immediately follow the provision of adequate mortgage money credit facilities—that is, if every home seeker of good character, good health, a steady job, and a good margin of real estate security could get a long term loan, to be payable in easy installments, with which to build or buy his home.

The remedy seems clear enough. It lies not in the direction of Government subventions for housing, either by the State or by the nation, nor in any of the ill-considered proposals for spending public money in doing things for the people that may best be done by themselves. Any even temporary expedient for the creation of State-supported agencies to provide housing, should be discouraged. That way, as the experience of England has demonstrated, lies waste, extravagance and ultimate futility, along with the demoralization of the normal activities of private initiative and enterprise. The way out is the true American way of wisely helping the people to help themselves, by increasing the incentives for individual thrift and industry and removing the penalties that unwise taxation policies now impose upon the savings funds that are employed in the creation of homes.



A Town Hall and Fire House

Excellent Type of Building for Housing Various Municipal Departments

THE problems of a small municipality are various and often complex. A city hall or council chamber is needed, for the protection of its houses a fire department is required, an ambulance is required if the town does not have a hospital equipped with one, and in every crowd someone gets unruly and a lock-up is required. These various departments all need proper housing and the apparatus must be available at any hour, this necessitating the quartering of a certain number of men, for whom sleeping and social rooms must be provided.

This is the condition that faces many small cities, and Ambler, Pa., has a Town Hall of which its citizens are justly proud, and it will serve as a good model for any other small city.

In uses this building has proven very satisfactory. Many improvement organizations besides the Town Council use the building for meetings at frequent intervals. During the winter it is used almost nightly for dances, lectures, entertainments, American Legion meetings, etc. On a few special occasions even the jail has been filled to capacity!

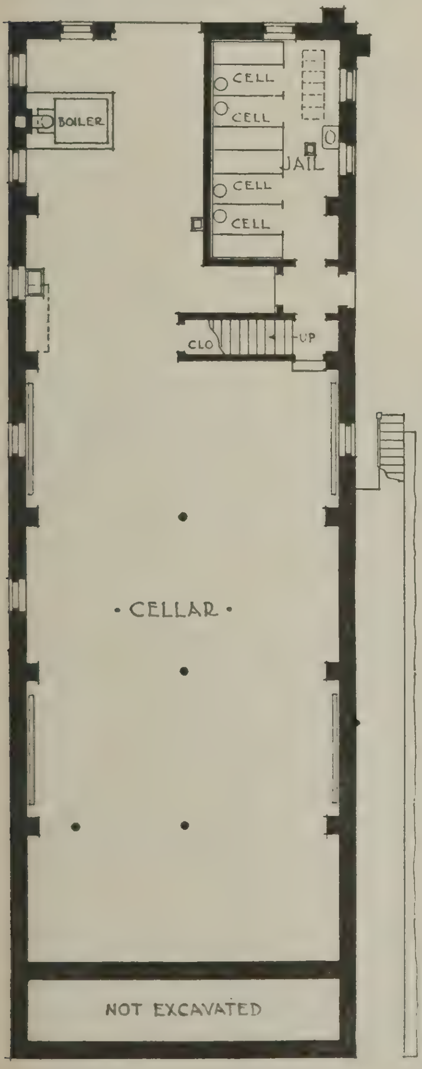
The site on which this Town Hall stands was occupied by a moving picture theatre, which was destroyed by fire, the brick walls, however, remaining in good condition. These old side and rear walls extended about four feet above the new second story level and were continued to the new height required. This wall, however, was not strong enough to carry the second floor, so new supports were provided by using steel columns inside of the walls, and these carry the entire weight of the upper floor. The location of these columns are indicated on the basement and first floor plans.

The old front wall was removed and a new front erected. The design of this is along Florentine lines. It is of varying shades of buff "Tapestry" brick, laid in shadow diamond pattern, with ornamental terra cotta of a light cream color.

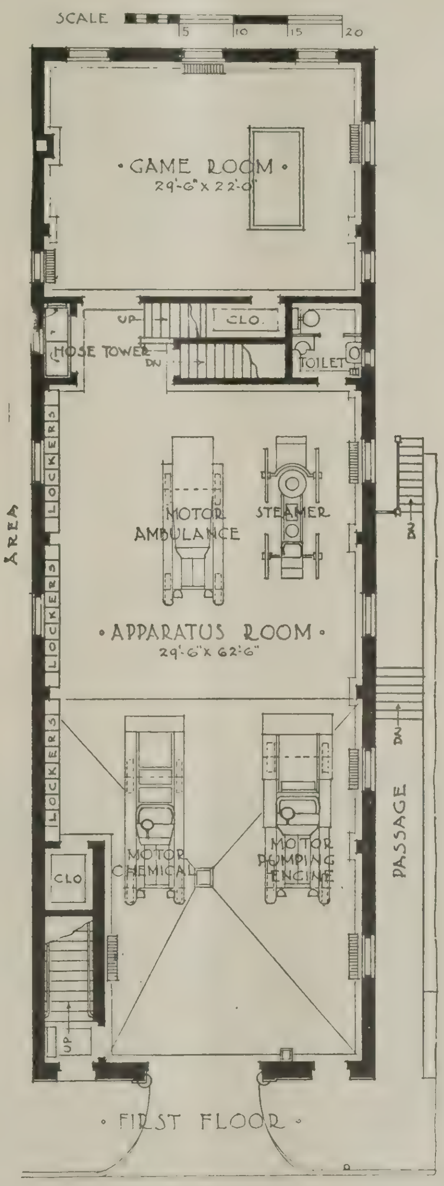
The triple window is in the form of an arcade and the spandrels between the arches are ornamented with a decorative motif showing the insignia of various old fire insurance companies. Above is an original panel of polychrome tile made especially for the building by H. C. Mercer of the Moravian Pottery and Tile Co., of Doylestown, Pa., in which is illustrated the history of fire fighting apparatus. First is shown an old town pump from which the firemen are carrying water in buckets. Next in order are shown an old fashioned hand pumping machine and a steam horse drawn engine. Here also is suggested a fight between rival companies. In the last picture is shown a modern motor driven pumping engine. The cornice is painted brown, orange and green touched up in places with red. While the paint was fresh it was rubbed over with dirt to give an antique effect.

Much credit is due the architects, C. E. Schermerhorn and Watson K. Phillips of Philadelphia, for their skillful handling of this problem. They have evolved a plan which admirably meets the need of a small city building.

The general contractor was Mr. Henry P. Schneider, Old York Road, Philadelphia, and he has co-operated with the architects in turning out a very creditable piece of work. The architectural terra cotta was furnished by O. W. Ketcham, of Philadelphia.

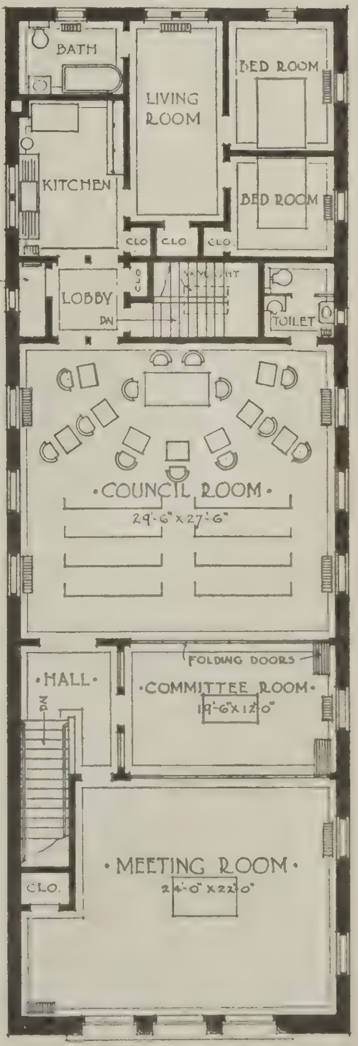


• BASEMENT •



• FIRST FLOOR •

BUILDERS should impress on their community the idea of better building so that civic pride will demand a proper and artistic housing of municipal departments.



• SECOND FLOOR •

The Treatment of Pine Knots and Sappy Parts

Practical Suggestions on Making a Good Painting Job on Knotty Trim

By A. ASHMUN KELLY

A SUBSCRIBER calls our attention to an article which appeared in the May, 1920, issue of BUILDING AGE, over the signature of Mr. Henry A. Gardner, Director of the Scientific Section of the Educational Bureau of Paint Manufacturers, Institute of Paint and Varnish Research, Washington, D. C. Mr. Gardner is quoted as follows: "Wood that has not been previously painted should have all knots and sap streaks brush-coated with turpentine not over an hour prior to the application of the first coat of paint. Shellac should not be used for coating such knots." Our correspondent then goes on to say that "this statement is absolutely contrary to all information that I have ever received during a long experience in the construction line, and I am interested in having this point explained more in detail. All specifications that I have read, many from high-grade architects, specify that shellac should be used over knots before painting. I would like also to know whether the statement concerning treatment of knots applies to interior work also."

I have before me a little pamphlet or circular, No. 1 of a series, and dated January, 1912. It was sent me by Mr. Gardner's secretary, in the absence of Mr. Gardner, and seems to cover the point raised by our correspondent. This circular is a report made to the Paint Manufacturers Association of the United States by Mr. Leo P. Nemzek, on the Re-painting of the North Dakota Tests. These paint tests were very elaborate and thorough, extending through several years, I believe.

Now then for Mr. Gardner's method of treating pine knots and sap. He suggests a wash, as he phrases it, immediately before painting, with turpentine, or wood turpentine, or benzol or toluol, etc., all of which are said to give good results. But the solvent that will do well on one kind of wood may not do well on a certain other kind, he observes, so that this point must be worked out by the experimenter or workman. His explanation is that the solvent cuts the resin, sap, etc., softening it to a considerable depth, so that when the priming coat of paint is applied it can readily penetrate the wood as well as act upon the resins, forming an amalgamated film, which later on helps to hold the paint to the wood. In most instances the wear over the knots so treated has been better than any other portion of the lumber, and that without showing any discoloration or resin exudations. A ready explanation exists in the fact that better and deeper penetration has formed the bond which makes for longer service value."

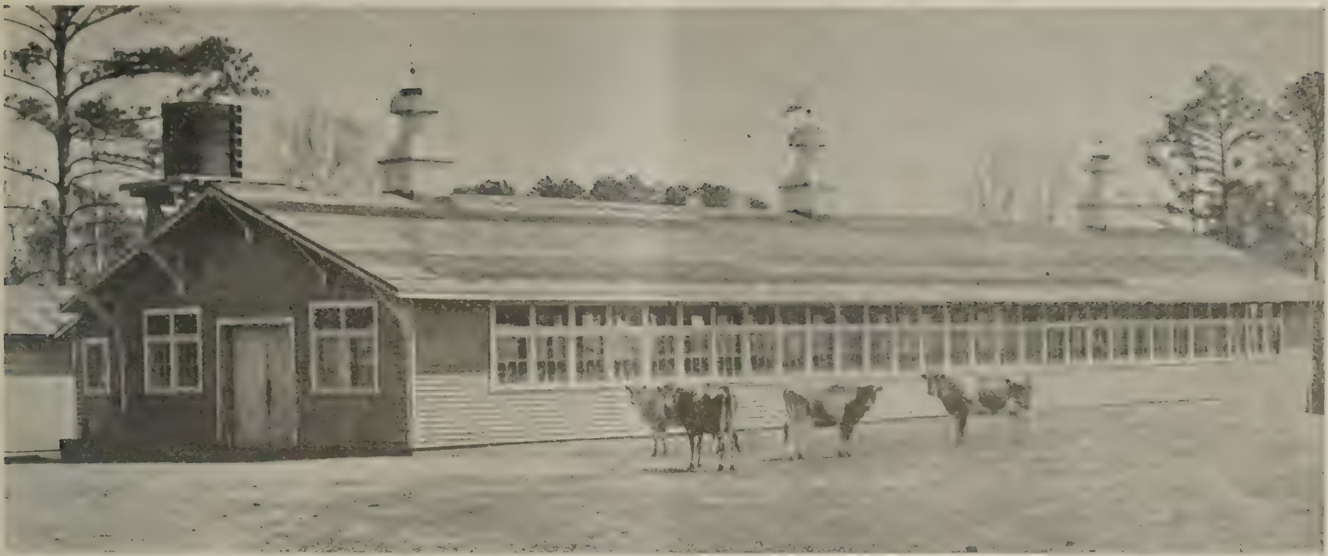
I HAVE given almost in full the contents of this circular, and with little change of text, just enough to abbreviate. And what shall be said in reply? It has been my uniform practise for over fifty years to use shellac varnish for "killing" pine knots and sap. It is not the only way that may be used, but to me it seems to be the most convenient and practical way. It does the trick. I have never known a case such as the North Dakota test shows. Such tests have less value than tests made in actual everyday work. I recall that not long after the tests had been accomplished some of our foremost master painters declared in print that such tests had little practical value. Of course this was, like mine, private opinion, but such opinions have value when coupled with the fact that the holder has had large practical experience. Yet I do not deny the sincerity of the tests. Great pains and expense were expended in getting results. Men expert in paint chemistry had them in charge. Paint makers have no other motive in view but that of increasing the efficiency of the paint and adding to our knowledge of paint and its application. They have given us invaluable information freely and generously.

There is hardly any paint so dark that a fat hard pine knot will not show through. Answering the other question of our correspondent, knots inside and outside work, must be treated in order to prevent discoloration. White and very light tinted paints require a white shellac. In no case should more than the actual knot and contiguous resin be coated with shellac. And the shellac should be made very thin, thin as turpentine almost. A light rub off with sandpaper should give a proper surface for paint to attach to.

In very fine work the knots have been cut out and replaced by clear wood of the same kind. This is expensive but very effective of course. Covering the knots with metal leaf has been practiced in some cases. Gold leaf, or silver or aluminum leaf will do, but such a method is expensive, both as to material and time. Such coatings are only indicated for certain pieces of very particular work. On exterior work, where the wood contains much fat pitch or resin the torch should be used, to burn out as much of the resin as possible and thus prevent its appearance under a hot sun.

Glue and red lead formed an old-time knot killer, and while I have never tried it out, yet it would seem to be effective; red lead forms a very hard, dense coating, and when combined with glue it should make as effective an agent as shellac. But after all, even with its present high cost, shellac varnish is the ideal coating for knots. Among painters there is a division of opinion concerning the method of its application, whether upon the bare wood or over the first or priming coat of paint. The former has always been my own method, but an equally effective result follows from its use on the priming coat. In early days we did not know about placing the shellac on the priming coat.

AND does not this satisfy Mr. Gardner's objection to shellac knotting, that the shellac need not be placed directly upon the wood? By shellacing on the bare wood the paint fails to enter into the fiber of the wood, he tells us. But by priming on the bare wood, with no treatment of the knots, not even with benzol or the other liquids he names, we get the same results as he by his method, so far as penetration is concerned, though admitting that we still render the paint open to deterioration by using shellac, if we admit also that his tests were beyond doubt conclusive as establishing the facts as he claims them.



Modern Dairy Barn

Plenty of Windows Give an Abundance of Light and Ventilation

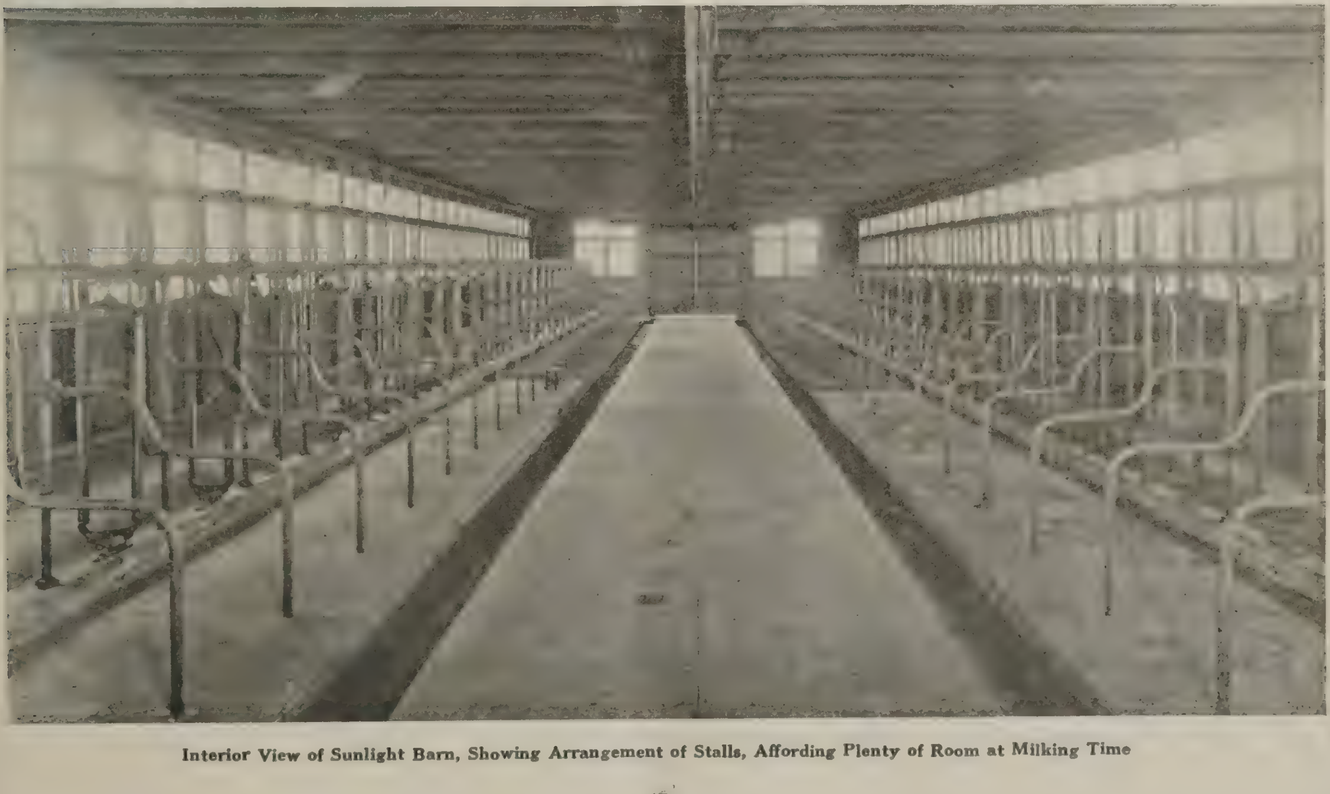
HERE is a dairy barn design that is largely all windows. It is that of the West Dallas Farms and is located at Orrville, Alabama.

Of course the window arrangement shown here is good for the South, but would not work out so well in the northern sections of our country as it would be too cold in the winter.

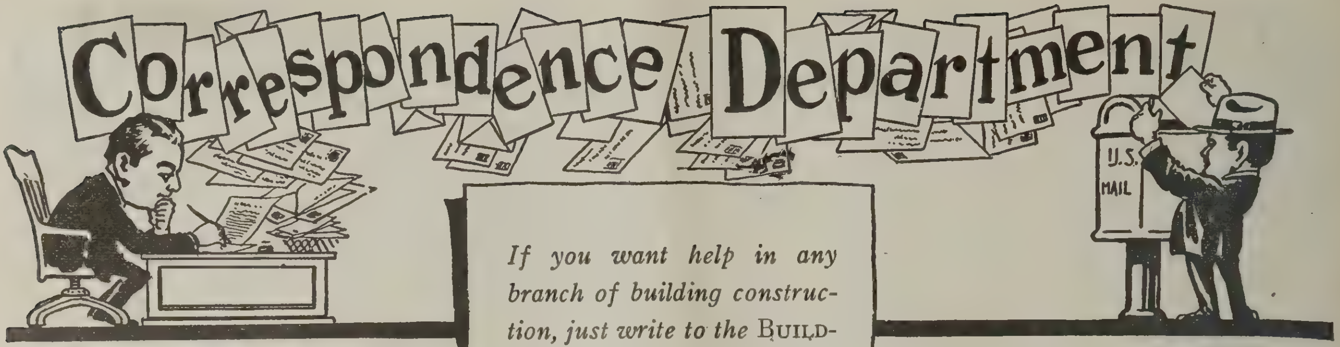
This design is interesting as it gives the maximum of sunshine and air. It is also supplied with patented ventilators for use in winter so that the "tenants" will have an adequate supply of fresh air.

Considerable attention has been given in the design to ease of working. The stalls are arranged, as the picture below shows, with the cows' heads out. This is a plan much preferred by dairy men because they can drive the manure spreader right through the barn every day to remove the manure.

The outstanding feature of this dairy barn is the quantity of light it receives. Dairy inspectors are insisting on plenty of light, and the cows themselves would if they could talk. However, it has been shown by records that cows that are well fed and housed give more milk and keep in better health.



Interior View of Sunlight Barn, Showing Arrangement of Stalls, Affording Plenty of Room at Milking Time



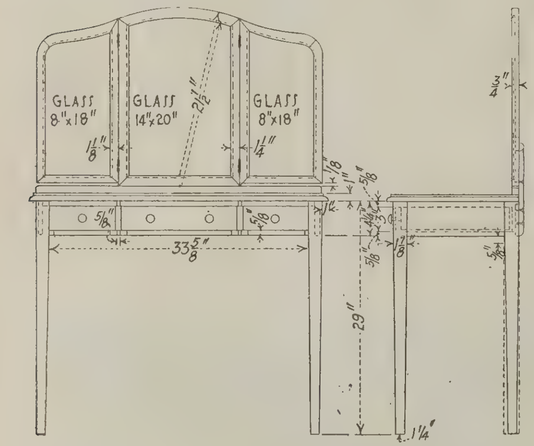
If you want help in any branch of building construction, just write to the BUILDING AGE *Correspondence Department. We will be glad to answer all your questions without charge.*

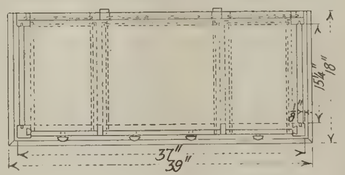
All readers are invited to discuss the questions and answers published.

How To Make a Dressing Table

THE dressing table described here may be made of any good cabinet wood, but quarter sawed oak or mahogany seem to be the favorite for a table of this sort.

The mirrors are of three glass swinging frame type and require careful construction. They can be made in any one of the three following ways: mortised, doweled or mitered.





The material needed is as follows:

1 Pc. 1″x18″x40″ Top.
4 Pcs. 1⅞″x1⅞″x30″ Legs.
2 Pcs. ¾″x4¼″x17″ Sides.
1 Pc. ¾″4¼″x35″ Back.
2 Pcs. ⅝″x1¾″x35″ Front Rail.
2 Pcs. ⅝″x1¾″x6″ Front Rail.
2 Pcs. ¾″x3″x9″ Drawer Front.
6 Pcs. ⅝″x3″x15″ Drawer Sides.
2 Pcs. ⅝″x3″x9″ Drawer Back.
1 Pc. ¾″x3″x16″ Drawer Front.
1 Pc. ¾″x3″x16″ Drawer Back.
1 Pc. ⅜″x16″x16″ Drawer Bottom.
2 Pcs. ⅜″x9″x16″ Drawer Bottoms.
2 Pcs. ⅝″x2″x16″ Drawer Runners.
2 Pcs. ⅝″x3″x16″ Drawer Runners.
2 Pcs. ¾″x1¼″x22″ Mirror Frames.
2 Pcs. ¾″x1⅛″x22″ Mirror Frames.
2 Pcs. ¾″x4″x12″ Mirror Frames.
2 Pcs. ¾″1⅛″x17″ Mirror Frames.
1 Pc. ¾″x6″x17″ Mirror Frames.
1 Pc. ¾″1¼″x17″ Mirror Frames.
1 Pc. ⅜″x8″x18″ Mirror Back.
2 Pcs. ⅜″x14″x20″ Mirror Back.

The top has a leaded edge to set it off. The drawers are made ⅞″ thick fronts with ½″ birch sides. The front is dove tailed with five doves and of the best construction. The advantages of the three drawers are that they are in proportion to the mirrors, and that a person sitting at the tabe can open the small drawers without moving the chair, as in the case when two drawers are used.

The mirror backs and the drawer bottoms can be made from wall board if desired.

The legs are tapered from all sides, the taper starting ⅝″ below the side rail, or 4⅞″ from the top of the leg.

The construction of a table like this will be good work for a wintry day when one has to stay at home, and it will add a piece of useful furniture to the house and please the Mrs.—**Leroy H. Pompa, 213 Plum Street, Aurora, Ill.**

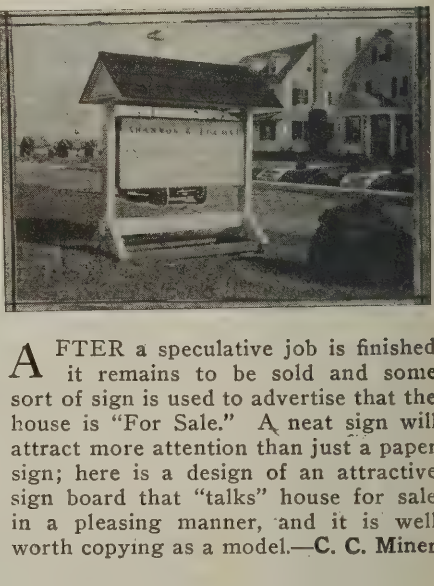
Covering Steam Pipes

WILL you please give full information how to cover the pipes of a steam heating plant; also what is the best covering to use.—**G. D. W.**

The best insulation is a number of dead air cells. Hair, felt and asbestos answer the purpose very well. For rough work the hair felt is just wrapped around the pipes and held in place by wire; for better work the felt or asbestos is covered with canvas sewed in place. This makes a neat finish. One can now buy ready made, for different sizes of pipe, asbestos composition sectional pipe covering, which are held in place by brass straps.

Asbestos cement can also be applied direct to pipe or boiler. It should be troweled to a smooth finish and it makes a better job to cover it with canvas.

An Attractive Sign Board



AFTER a speculative job is finished it remains to be sold and some sort of sign is used to advertise that the house is "For Sale." A neat sign will attract more attention than just a paper sign; here is a design of an attractive sign board that "talks" house for sale in a pleasing manner, and it is well worth copying as a model.—**C. C. Miner**

Worm Fences

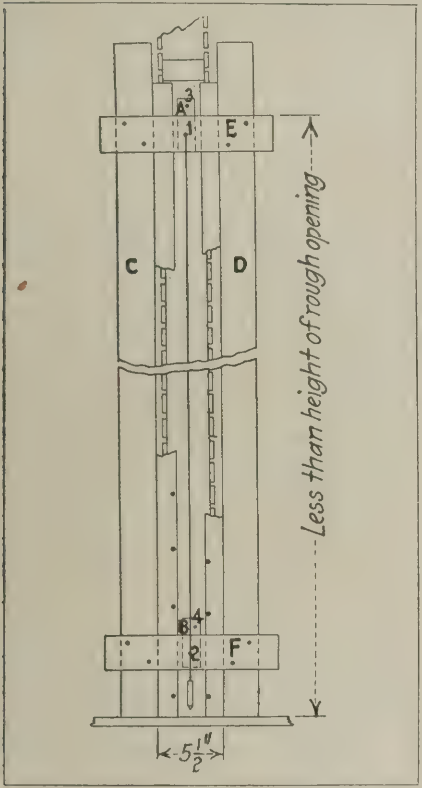
KINDLY furnish through your next issue of BUILDING AGE a sketch showing the construction of Worm Fences same as used on farms, etc., and made of split oak or chestnut.—**William F. F.**

We do not know exactly what our correspondent means by 'worm fences." Perhaps some reader can give the information. Our correspondent may mean what we call a split rail fence, laid zig zag fashion, the ends of each rail being notched to fit over the one below.

Placing Grounds for Plastering

HERE is an illustration of a little device to aid one in putting on grounds for plastering.

Take two straight edged pieces of 1"x3" fastened 5½" apart by means of two cleats. The uprights (C & D) should be a few inches longer than the height of the rough door opening. One cleat is fastened 10" from the top end of uprights, the other about 6" from the lower end. Fasten blocks (A & B, ½x1½x6) on the back of each cleat, letting them project above as shown in illustration. Drive a nail in the top cleat at point 1, center of distance between uprights. From this nail suspend a plumb bob. Drive a nail partly in at point 2, which is the center of space from C & D. This nail serves as a guide to tell when the gig is plumb.



To use the device place gig against studding of rough opening, leaving the same amount of space between lath and uprights on each side at the top. Drive a nail partly in studding at 3 through block A.

Move the gig at the bottom so that plumb line touches the nail 2 in cleat F.

Fasten to studding by nailing temporarily through block B at point 4.

Nail lath to studding, holding them firmly against the inner edge of upright.

Remove gig by drawing nails 3 and 4. —**A. A. Rockford.**

Using Dynamite for Breaking Up Concrete

A BANK in this locality had a large vault. It was made of brick set in the best Portland cement and guaranteed to be fire and burglar proof. The walls were 20 inches thick and the vault was 14 ft. long, 12 ft. wide and 7 1-2 ft. high. The roor was 2 1-2 ft. thick, supported by six 12-inch eye beams, each weighing 325 pounds. The whole constituted a ton of steel and 49 tons of brick and cement.

When the bank took up new quarters across the street, it was necessary to dispose of the vault and I was employed to remove it. There were five plate glass windows, 40 ft. away, besides seven transoms, four small windows and four glass doors, which were in close range. The brick side walls were 4 ft. away, and the ceiling 14 inches from the top of the vault.

I protected the plate glass by a canvas screen hung from the ceiling. The windows I boarded over. Five feet away from the vault on one side, with only a thin brick wall intervening, were girls selling dry goods and on the other side several girls trimming hats.

I first drilled a 13-inch hole into the wall of the vault near the door and loaded it with 1-3 cartridge of 40 per cent. dynamite, tamping the charge with damp sand. Before firing the charge I placed some heavy planks and timber, also a heavy canvas, over the bore hole. The shot which, of course, was a light one merely loosened a number of bricks but it gave me an idea how heavily I could load.

I then loaded three holes 18 inches apart and 18 inches from the end of the wall, which were fired simultaneously by means of a blasting machine. These holes were also loaded with light charges as, of course, it was necessary to break up the concrete in small bites rather than to attempt to smash it up with one charge as would have been easily possible had it been out in the open and there had been no necessity for protecting nearby buildings and glass.

In the course of fourteen days the job was finished. The salvage was mine and reckoned as part of my compensation. I sold the eye beams for $31; some miscellaneous junk for $1.75, and the brick and other salvage material for sufficient to make my total receipts $235.75. I paid $28.83 for team hire, $44.25 for labor, $2.60 for dynamite, $5 for electric blasting caps and $5 for incidental expenses. My own time I figured at $5 per day.—**Charles C. Riker.**

How to Find the Strength of Ropes

CAN you give me a simple rule for finding the strength of common manila rope, such as is used for hoisting, etc.—**A. L. W.**

At the Bureau of Standards laboratories in the Department of Commerce, tests have been made that have resulted in answering that question with a formula.

For three-strand regular manila rope from 1-2 to 4 1-2 inches in diameter, the following computation will give the breaking load of the rope:

The average breaking load in pounds equals 5,000 multiplied by the diameter of the rope in inches, multiplied by the diameter of the rope increased by one.

This will give, of course, the average maximum weight that the rope will hold but the working load or the load that a contractor or safe-hauler may apply with proper safety and precaution would be considerably less than the load given by the formula.

HAVE you ever used any machinery or device which has saved you time and money? Have you ever invented any way of doing a piece of work quicker? If you have BUILDING AGE wants your experience, and will pay regular space rate for it.

Your description should tell just how you saved time and money, either by a special way of using machinery or by short cuts in construction. Point out what methods you were using before adopting your "Time Saver" and show how your new method turns the trick. You can submit as many articles as you want.

Address The Editor, BUILDING AGE, 920 Broadway, New York City.

A Floor Scraping Kink

I HAVE a suggestion for those who have floors to scrape. I have always used it and have found it a great help, as I do lots of that kind of work.

Having no electric sander we surface our floors with a machine scraper or 'dray." We find it is a great help to mark the floor all over, close together, with a coarse pencil or marking crayon. Then, when standing up working, we can see when the floor is down to a surface, as any unevenness between the boards shows the mark till scraped down; if marked all over, and all the marks are scraped out you can be sure that the floor is down to a surface without feeling, which saves time. If a fine job is wanted "comb" out the wrinkles with a hand scraper, which is quickly done. —E. W. Conlee.

Community Garages

By RICHARD SHEPHERD

COMMUNITY or Individual Garages are common names for garages or semi-private garages built in blocks of from two to twenty, usually one story high, but frequently a second story is added for use as a shop or a hall. In this connection it might be suggested that such a group, with a second flor carpenter shop, would no doubt provide sufficient revenue to pay the carrying charges of the shop for a builder.

A second floor is sometimes used for car storage where the natural contour of site provides an incline by which this level may be reached.

As the garages are frequently built in residential sections, some thought should be given to the exterior design, since this can be made very attractive at a slight additional expense. The projecting hood on the garages shown in top picture, not only forms a weather protection; it gives a more distinctive appearance than the plain metal or wood cornice. The hood is roofed with green slate-covered asphalt shingles.

The advantages of this type of garage, which find favor with tenants are, lower cost of storage, more privacy and less damage of the kind that occurs in crowded public garages. The usual rental for such a garage is from five to eight dollars per month, depending upon the size of the garage and the demand for space.

City building regulations or state laws have certain requirements for construction. In this State (Pennsylvania) partitions can be built of galvanized iron for a height not exceeding six feet. The space from top of galvanized iron to ceiling to be enclosed with chicken wire; but brick partition walls to act as fire stops must be erected at least every fifty feet in the length of building.

A lowered insurance rate can be secured by building all partitions of brick, tile or concrete, and also by using a metal lath and cement plaster ceiling attached to the rafters.

Where brick partitions are used between each compartment, rafters may be dispersed with, and the roof can be formed of 2-in. plank, which will have more than double the resistance to fire that 1-in. sheathing provides.

The size of the spaces for storage are frequently regulated by the width of the lot upon which the garages are built. The clear space between partitions should not be less than eight feet and need not exceed ten feet. The depth from rear wall, when hinged doors are used, should be at least sixteen feet; a depth of eighteen or twenty feet will in most cases provide space at the rear for a work bench. When this is provided there should be a window in the rear wall.

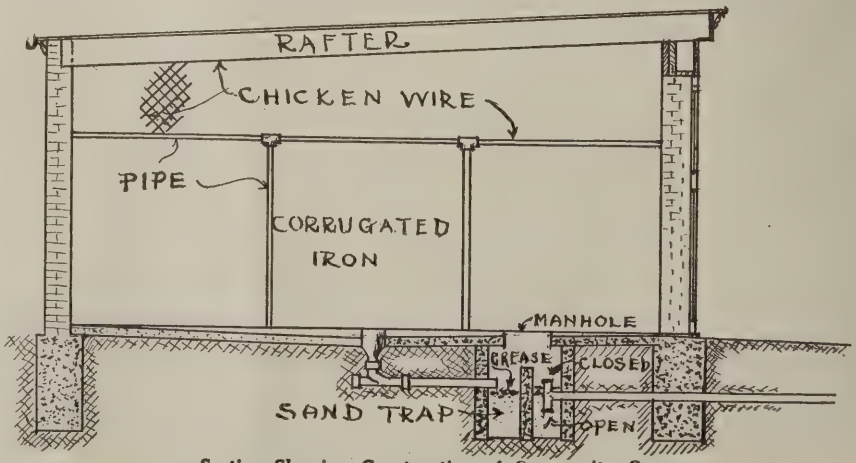
The height of doors, where pleasure cars only are stored, need not exceed eight feet, and the low ceiling height can be made the same. Trucks will require a height of ten or eleven feet and vans about twelve feet.

When brick partition walls are provided a shallow spread footing of brick or concrete, designed according to the nature of the soil will meet all requirements for foundations since they will not be affected by frost. The foundations for exterior wall should of course be extended below the frost line.

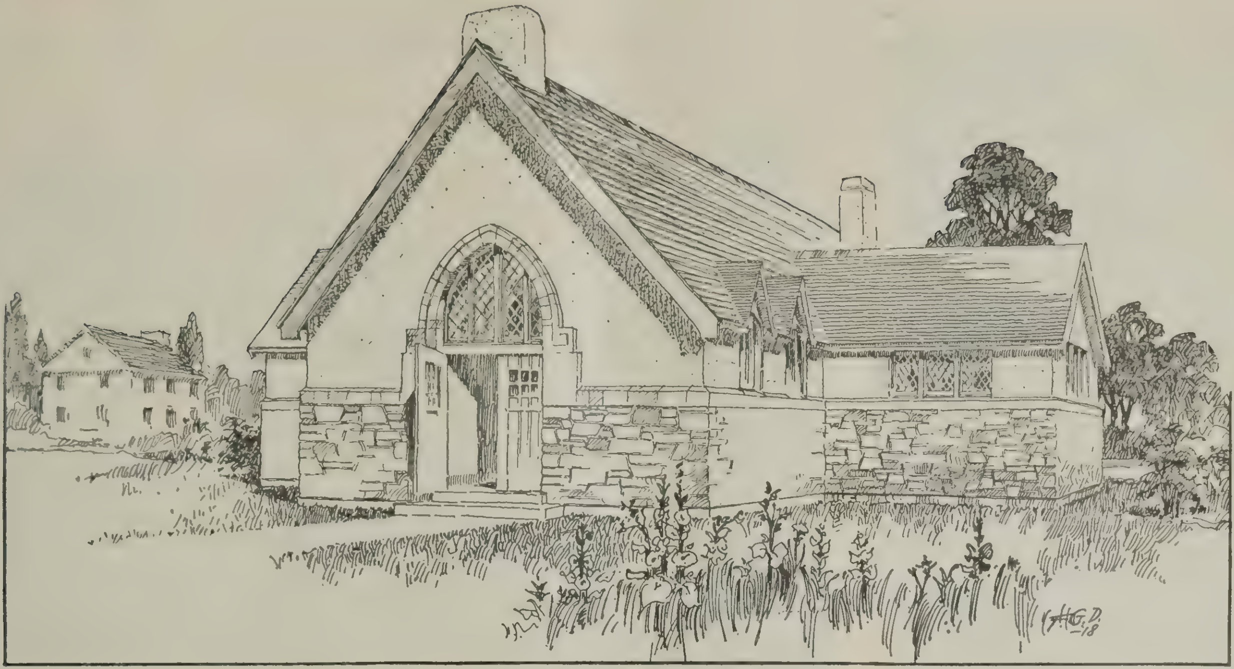
The garage doors should be built of ⅞-in. "V" jointed material on a frame of white pine or cypress, mortised and tenoned. 1⅜-in. material should be used for frame to permit of proper mortising and to prevent warping. 1⅛-in. material can be used provided the stiles and rails are increased in width sufficient to provide strength against warping.

The doors can be arranged as sliding-folding doors or right-angle sliding doors when conditions make this necessary, but the most economical and satisfactory method is to hinge the doors on heavy wrought iron strap hinges, with eyes on the end rather than hooks.

The length of hinges should not be less than two-thirds of the width of the leaf supported, and three hinges on each leaf are most satisfactory when doors exceed eight feet in height.



Section Showing Construction of Community Garage



For Better Small Church Architecture

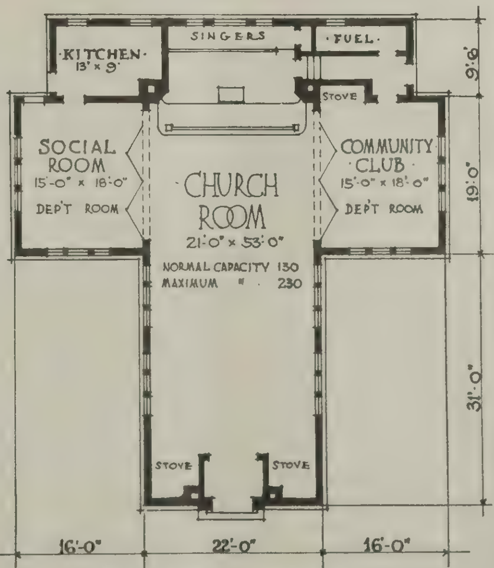
An Interesting Departure in Denominational Enterprise Encouraging Better Design in Small Town Churches

A BUREAU of Architecture has been established by the Methodist Episcopal Church. The functions of the Bureau is to advise and counsel in a preliminary way with the representatives of churches undertaking new building projects.

The Bureau particularly strives to obtain the adjustment of church architecture and arrangement to the needs of the community in which the institution is to be erected and to the changed conditions and requirements resulting from modern modifications of church and, particularly, Sunday school methods. A case in point is afforded in the present requirements and appointments of an up-to-date Sunday school building.

Under the form of Sunday school organization, until recently in vogue, one of the first requirements necessary was to provide in the church one large Sunday school room where the whole school could assemble. The familiar scheme was to have classrooms "radiate" from this large room, the arrangement being such that, theoretically at least, the superintendent could see from the rostrum every pupil in every room.

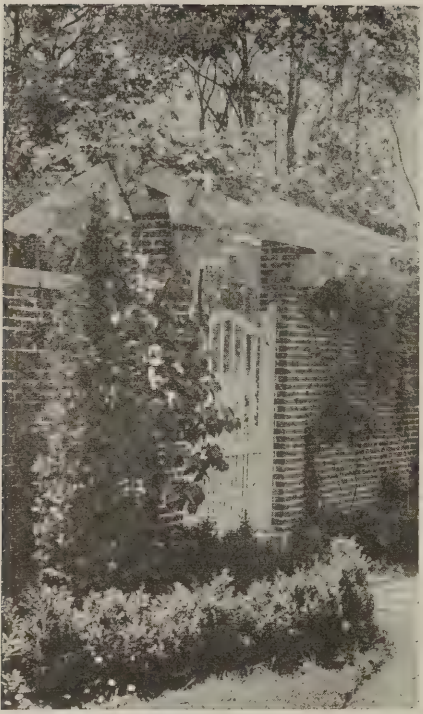
Modern Sunday schools, however, are now divided into as many as seven component parts. These are called "departments." They are the Beginners, Primary, Junior, Intermediate, Senior, Young People, and Adult. Each department meets separately, and in planning a church plant nowadays it is necessary to provide facilities for conducting each department separately. Only upon rare occasions does the whole school meet together, and at such times the church auditorium is used.



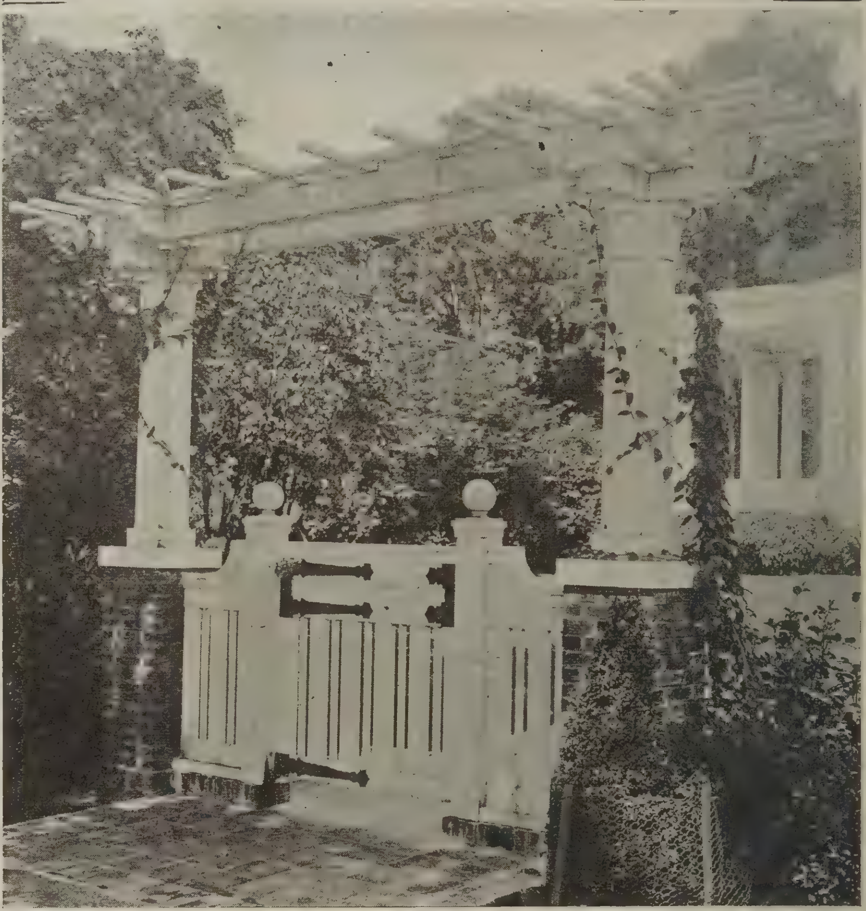
·FLOOR PLAN·

In providing for these various departments in a new church one aim in incorporating plans for Sunday school accommodation is to keep the children out of the basement. Every device is used to make the department rooms as attractive as possible. To this end low ceilings, abundant windows, cheerful decorations and comfortable furniture are resorted to.

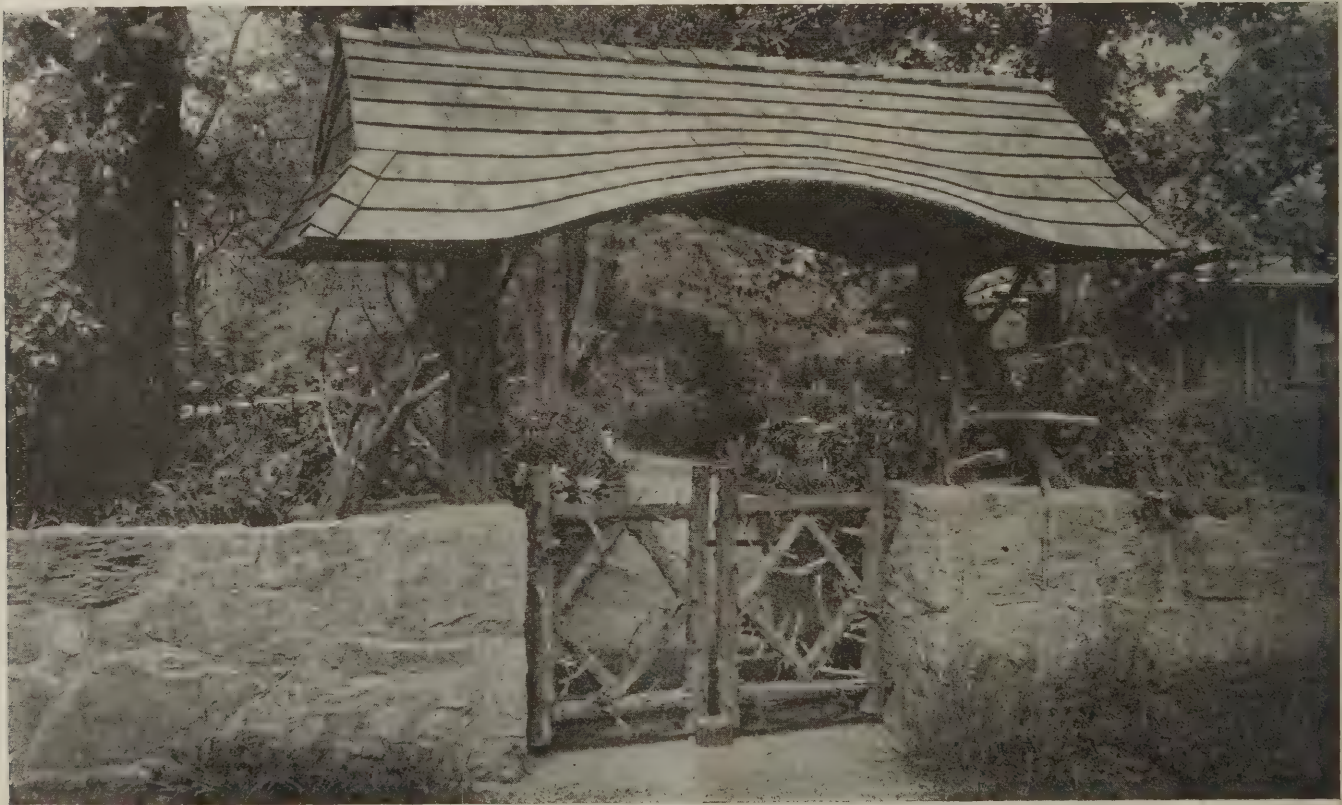
The plan and exterior shown here is a suggestion for a small church intended to be erected in a Southern state and heat is only required occasionally so that stoves solve the problem. If built in a colder climate a small cellar to accommodate a pipeless furnace would answer the purpose. Steam or hot-water heat may be used if preferred.



Attractive Garden Gates



Simply Made At But Little Cost a Well Designed Gate Adds to the Attractiveness of Home and Garden. Builders Can Create Some Extra Winter Shop Work by Suggesting to Home Owners the Desirability of Having Artistic Gates, Pergolas, etc.



What the Editor Thinks

Group Building

IN several articles in this issue are shown the results that may be obtained by designing, building and grouping houses together so as to form a related group and in this way enhance the value of all.

We are all only too familiar with the present deplorable system where everybody builds what he likes and as he likes it, with the resulting jumble of all sorts and sizes of architecture on one street.

At many of our progressive real estate tracts certain restrictions were made by the far-seeing developers and these places have grown to be charming localities. In some cases entire towns have been formed this way. There is danger, however, that there will be too much sameness—there must be variety for real beauty and restfulness.

One town was developed in streets, etc., but all the houses were restricted to be of concrete construction with red tiled roofs; the result was that it produced a sameness and was taken by strangers for some large institution—the effect on the residents was the same and many families have moved away because there was a "dead feeling" there that was depressing.

One should be careful of how the other houses are on your street—plan something that will look well with the others. Here is where the builder and architect should use his influence with the home owner. Impress on them not to build a $25,000 house amongst $5,000 dwellings or a $5,000 house amongst $25,000 houses.

A bungalow looks squatty and out of place between two four-story apartment houses. A two-story house placed among bungalows can be made to look right if the roof lines are carried low so as to give a bungalow look to the design.

Design your homes so they will look well with the surroundings if you want something good. It will raise the value of all the property.

The "court" idea has been developed to quite an extent for apartment houses in Chicago and other midwest cities, but has not developed as much in the East.

What makes the apartment house so desirable is the fact that housekeeping is easy. The court idea for small houses can be worked along the same line. A janitor to take care of the place, removing garbage, cut grass, keep walks clean, etc., besides furnishing hot water supply and heat from a central heating plant would give the individual house occupant all the advantages of the apartment plus the benefits of a separate house.

Here is a chance for the progressive builders of the East to develop something novel in the building line. The articles we publish are merely suggestive of what can be done. Even a small piece of property can be laid out so that it will form a picture, beautiful in itself and in harmony with its surroundings.

Our Cover Design

THE home illustrated on our cover this month is one that will appeal to many. It has such a comfortable, homelike look and is so inviting—on every window and door it breathes the spirit of welcome at Christmas time.

It is in homes like this that the true American spirit can develop. The progressive builder who has a prospective home builder in view would do well to show him this copy of BUILDING AGE—a glance at our cover picture will make one want to be in one's own home for next Christmas. Picture to them how their new home would look next Christmas and sign the contract to start in the spring.

No better argument can be had for a built-in porch or sun parlor than this cover picture; here it is snow and ice outside and inside is warmth and comfort—and a tree for the kiddies.

This residence is the home of Mr. and Mrs. C. S. Meacham of Oak Park, Ill. The architect was Mr. Thornton Herr and the builder Mr. J. L. Bernard. The house was built some years ago, and the sun parlor is only a recent addition.

Prevent Accidents

ACCIDENTS are largely caused by carlessness of the workmen, or lack of ordinary safeguards. Staging is carelessly built and inadequately inspected; runs above ground are laid only one plank wide; roughly built ladders composed of narrow cleats nailed to vertical uprights are used even on lengthy jobs in place of stairs, which the best contractors find mostly economical as well as safer; runs and passageways in constant use in high buildings are built without rails and obstructed with steel or lumber; overhead traveling cables are unprotected.

Small attention is paid to the details of construction in these matters. Conditions which would not be tolerated in a factory for 24 hours are found on every job.

The amount of actual saving that can be made on a large construction job by providing proper roadways and runs and inclines are but little realized by the average contractor.

According to reports that come to our office there are more accidents occurring on small construction jobs than on large jobs in proportion to size and men employed.

It will save money to take proper precautions for safety. On alteration jobs stepping on nails is the most frequent trouble. Insist on the men wearing thick soled shoes and bending down all spikes—it takes a little time, but it is worth it.

Index for 1921

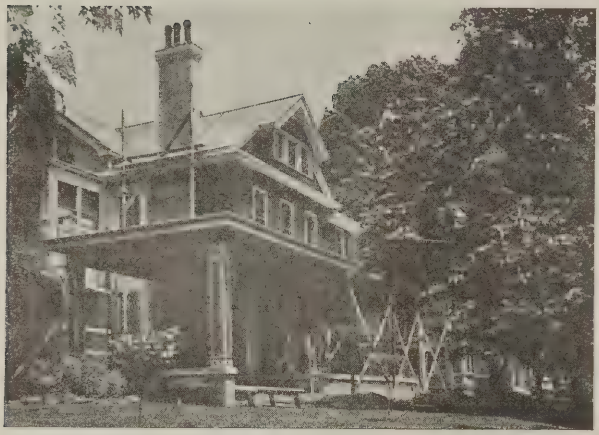
WE have prepared an alphabetical index for the 1921 volume of BUILDING AGE. A copy will be sent to anyone on request.

Building in 1921

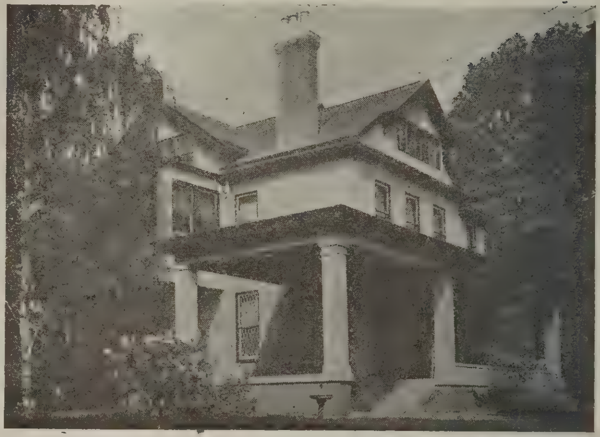
THIS month brings to a close one of the best years the building business has had. Unhappily, at the beginning of the year, there were many bickerings about material and labor, but these, in most places, have been all settled, and the road is now clear for next year. Let all get together and push to make 1922 the biggest building year.

"Before" and "After"

Interesting Examples of Two Remodelling Jobs



Before Improving



Alteration Completed

THE store and office building shown below consisted of two separate old-style "loft" buildings. They were altered for a tobacco company, who now occupy the completed premises, which are located at 111 Water street, New York.

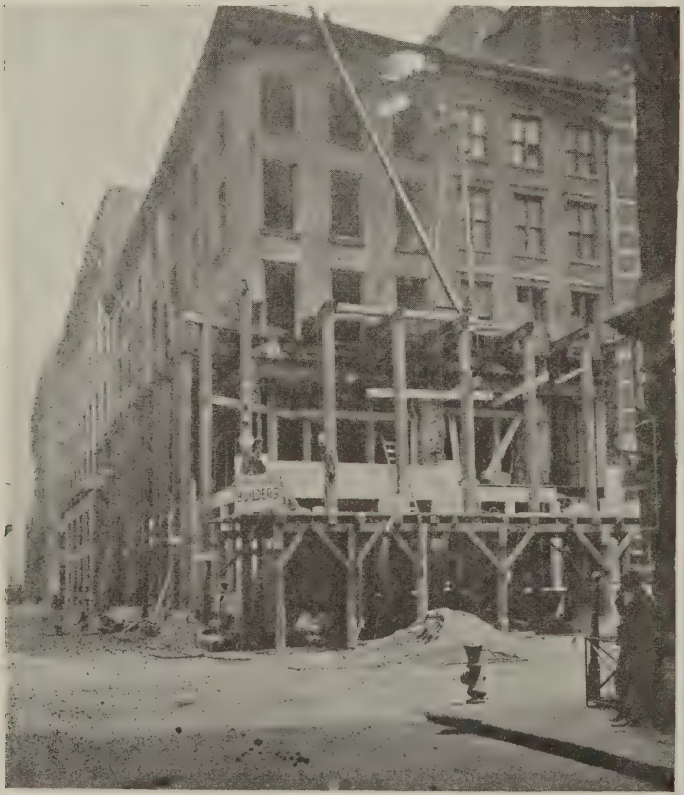
Mr. W. A. Giesen was the architect and Seymour Schompau the contractor.

All of the old walls on front and side were removed for the first two floors and a new, modern front built in place. To do this it was necessary to shore up the upper part of the building, and this the above picture shows. The steel beams and columns are in place. The other picture shows the alteration completed.

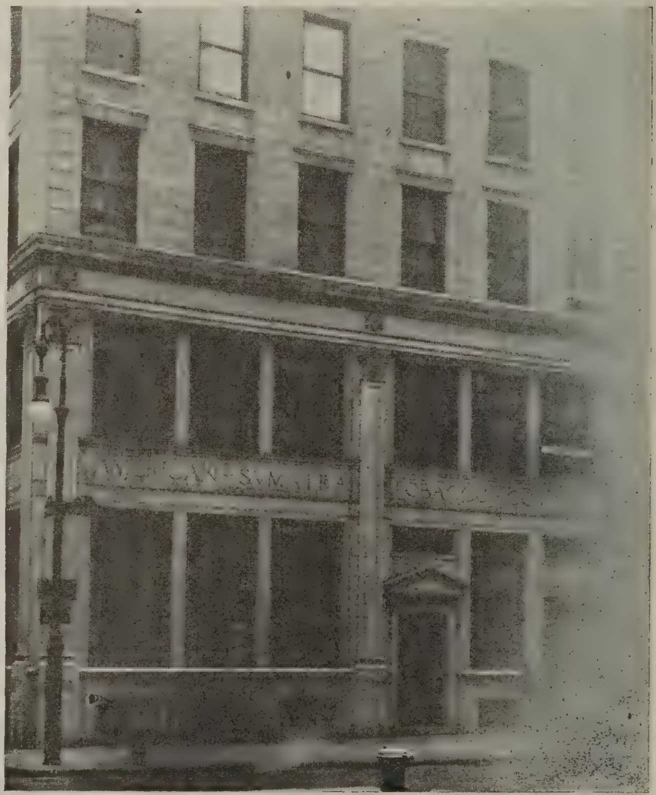
TO repair and remodel existing structures is a worthwhile business. Many a good, substantial building is "out of date" as far as modern conveniences and design. A little money spent on improving the old building puts it in first-class shape, the same as if it was built new.

The residence shown here is that of Mr. Arnold Laichen, Cincinnati, Ohio, which was overcoated with stucco, changing its external appearance and making the house much warmer in winter.

From time to time Building Age will publish interesting examples of remodeling as they show what can be accomplished in this line.



During Alteration



Remodeling Completed

How to Save Time in Preparing Estimates

Practical Remarks on the Use of Quantity Surveys

By WILLIAM GRAVES SMITH

IN a report made by a joint committee representing the American Institute of Architects, American Engineering Council of the Federated Engineering Societies and the Associated General Contractors of America, the following recommendations were made regarding quantity surveying and payment for estimating:

1. Quantity Surveying

Architects, Engineers and Contractors should jointly use their efforts to have established facilities for making quantity surveys.

2. Payment for Quantity Surveying

The owner should pay for the quantity survey from ¼ of 1 per cent. of the cost of the project for commercial and public work and not more than twice as much for residence work, whether the project is constructed or not.

3. The Cost of the Project

The cost of the project be defined as the accepted bid, or in cases where no bid is accepted, the bid of the lowest responsible bidder as determined by the Architect or Engineer. However, in cases where alternate bids are required, the additional payments for the quantity survey shall be based upon the additional quantities surveyed, as approved by the Architect or Engineer.

4. Altered Plans

Altered plans which involve a change in quantities after the quantity survey has been made justify an addition to the original fee for quantity surveying.

5. Basis of Contract

Owners should have the option of—

(a) Making the quantity survey a part of Contract, or

(b) Permitting the successful bidder, at his own expense, an opportunity to verify the accuracy and completeness of the quantity survey before the contract is signed. If he proves errors to exist in the quantity survey, the bidder shall be permitted to adjust his bid accordingly.

6. Unit Quantities and Standards

The schedule of unit quantities should conform to local customs or methods of measurement and should be so stated on the quantity survey. The eventual adoption of national standards is recommended.

7. Guarantee

The guaranteeing of quantities by a Quantity Surveyor is not recommended, for it might influence the Surveyor to protect himself by increasing the quantities. The extra cost of a guarantee would not be warranted.

8. Existing Methods

The cost to Owners of preparing bids by existing methods, which make necessary wasteful duplication in estimating quantities by several bidders is known to be much greater than the cost of preparing bids based on a quantity survey furnished by the Owner, and therefore such existing methods are condemned and should be discontinued.

The Report lays great stress on the economy of using quantity surveys. But of even greater importance is the possibility of getting fair contracts; contracts under which both parties know exactly how much work of every kind must be done and also that the contract price includes a sum for every item of work required only.

A quantity survey establishes the minimum requirements of a building in terms of material and items of work. This is published for the use of all bidders. It is made the uniform required basis of competitive bids in order to determine which bidder can do the work listed in the survey for the least money. Bidding becomes a competition to decide which bidder will be selected for the award of a contract. Thus a contractor bids without assuming any responsibility for the accuracy of the survey supplied to him for that purpose. It is an absolute waste of time for him to check it at that time. There's economy because bids can be made without quantity expense.

The preparation of a quantity survey eliminates almost entirely the possibility of claims for extras and allowances. It does this automatically. When a surveyor discovers ambiguous or contradictory items in the plans or specifications, he consults with the architect as to their proper interpretation. It is a fundamental principle that a survey must have a basis of fact in the plans, or instructions from the architect, and must not include items which are merely assumptions of what it is thought the architect may mean or will demand under contract. A surveyor conscientiously uses every effort with the co-operation of the architect to make sure that the survey states exactly what kind and how much work is required. In other words, there can be nothing indefinite in the plans or specifications after they have been through the surveyor's office. The result is that the customary contingent items are left out of the bids. There's a source of economy.

Another source of economy lies in the accuracy of a properly made survey. Experience shows that a survey prepared by competent experts in the various trades, whose sole object is to make accurate survey, as compared with what equally good men would do in contractors' offices under the stress of rushing out bids makes a difference of a few per cent. in favor of the professional survey. This difference alone more than pays for the service of the quantity surveyor.

The greatest benefits of the survey plan come from the definiteness and protection in the steps leading up to a contract. First, the amount of work is made a fixed quantity. This is made the basis of a competition. Differences in the interpretation of plans are eliminated as a factor in bidding, as are also the chances of errors in scaling and computing quantities. Every bidder has a real opportunity to show his fitness for the job, because each bidder is naming a price for exactly the same thing. Then, the successful bidder is given the fullest and most satisfactory protection possible by checking up the survey before signing a contract. The result is a fair price for a building, a price which should give the contractor a profit because he has been protected against omissions in his estimate. Also a good building, well built, without extras, because there is no work overlooked in the bid.

Review of Building Situation

CONSTRUCTION activity in October, according to figures published by the F. W. Dodge Co., show that the total contracts awarded (not contemplated) amounted to $222,479,500. This is only 10 per cent. less than the high record figure of September, but it is 25 per cent. higher than that of October 1920.

New England shows for October an increase of 35 per cent. over September, which indicates that the builders there will be very active all of next year, as a large amount of residential work is under construction. The Middle Atlantic States as well as the North Western States show about the same activity as in September. The Middle West States show a decline of 12 per cent. from September. In the New York and Pittsburgh districts there was a decline of about 17 per cent. The total for the New York district, however, was the largest for any month this year except the record month of September.

Residential building continues to lead with more than 40 per cent. of the total cost; there is also considerable activity in the construction of business buildings and schools.

Open Shop Movement in the South

FROM Sherman, Texas, we hear echoes of the open shop movement. The following letter has been sent out by the Committee for Open Shop Mechanics of the Citizens Welfare Open Shop Association of Grayson County.

To Builders and Prospective Builders:

The undersigned, appointed by and representing the open shop mechanics of Sherman ask that you let our contractors and our mechanics have the privilege of figuring on all building construction contracts let by you.

We have in Sherman a full line of open shop mechanics and are prepared to handle any class of construction work, including brick, stone, concrete and wood as well as all classes residence construction. We have contractors and workmen who can handle any job of painting, paper hanging and decorating.

Our contractors have constructed some of the best jobs in Sherman and Grayson County and are prepared to handle any job, large or small.

Our contractors would appreciate an opportunity of figuring on your job and believe that our figures will prove interesting to the builder.

In case you have a job that you want handled by the day there are good open shop mechanics ready to serve you. Each of our open shop mechanics draws wages according to his ability. This is to the advantage of both the builder and to the mechanic for it enables the builder to get value received for his money and it enables the mechanic to get all he can earn.

Any time you need a mechanic by the day or you want a job figured 'phone 816 and leave word. We will appreciate this favor on your part and every effort will be made to see that you are properly served.

Very truly,

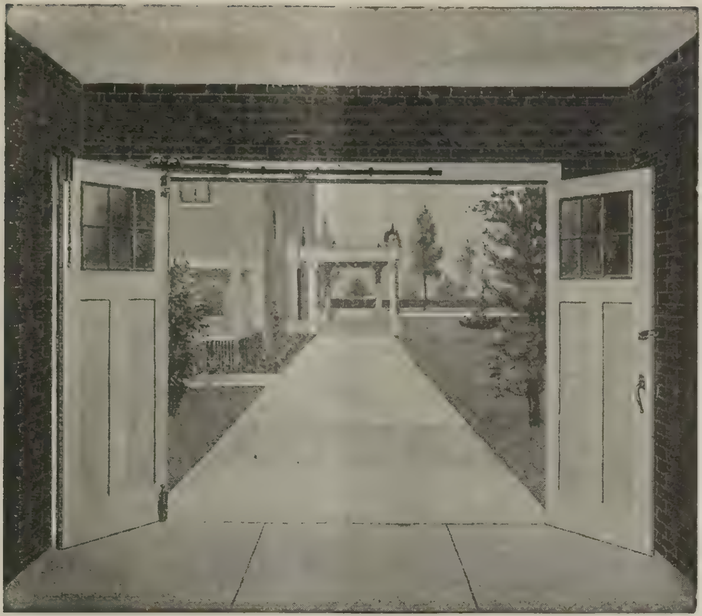
C. A. Elliott
Lon Davis
C. R. Kelly
George Tebow
Committee for Open Shop Mechanics.

Record of October, 1921, Building Contracts Awarded

Classification of Building	SECTION OF COUNTRY						
	New England District	New York District	Mid. Atlantic District	Pittsburgh District	Middle West District	North West District	Totals
Business	$5,359,300	$14,733,500	$5,431,000	$3,740,000	$7,533,400	$607,600	$37,404,800
Educational	3,341,000	3,447,000	5,808,600	1,544,200	6,654,500	1,633,800	22,429,100
Hospitals and Institutions	1,436,400	684.600	600,900	921,000	652,000	905,000	5,199,900
Industrial	826,100	4,214,400	2,671,600	5,969,300	4,538,400	198,800	18,418,600
Military and Naval	25,000	11,100	66,700	14,300	230,000	....	347,100
Public Buildings	295,500	79,200	256,900	258,700	624,300	8,200	1,522,800
Public Works and Utilities	756,100	7,933,900	6,722,600	8,344,800	10,059,900	1,323,400	35,140,700
Religious and Memorial	403,000	889,000	1,205,000	1,127,600	1,890,500	219,500	5,734,600
Residential	8,566.600	41.265.400	10,272,300	11,129.100	16,503,400	1,912,700	89,649,500
Social and Recreational	693,000	1,967,000	580,500	883,000	2,398,900	110,000	6,632,400
Miscellaneous	....	....	....	....	....	....	....
Total	$21,702,000	$75,225,100	$33,616,100	$33,932,000	$51,085,300	$6,919,000	$222,479,500

Building Projects Contemplated October, 1921

Classification of Building	SECTION OF COUNTRY						
	New England District	New York District	Mid. Atlantic District	Pittsburgh District	Middle West District	North West District	Totals
Business	$4,237,800	$7,865,500	$4,651,000	$10,259,600	$11,952,900	$1,569,500	$40,536.300
Educational	2,103,000	4,464.500	5,684,000	9,746,800	14,930,700	1,031,000	37,960,000
Hospitals and Institutions	815,000	475,500	1,095,000	905,500	4,358.000	365,000	8,014.000
Industrial	1,844,600	2,641,900	4,238,400	5,069,800	10,410,100	1,012,300	25,217.100
Military and Naval	30,000	350,000	95,000	31,000	750.000	25,000	1,281,000
Public Buildings	179,000	66,300	567,200	320,000	4,314,600	448,000	5,895.100
Public Works and Utilities	2,264.300	6,082,100	7,965,200	7,358.000	58,327,100	4,946.600	86,943,300
Religious and Memorial	747.000	1,159,800	1,266,000	945,000	11,549,300	488,800	16,155,900
Residential	20,473,500	48,551,700	16,804,500	18,988,700	45,025,800	3,171,100	153,015,300
Social and Recreational	1,529,500	4,273,500	1,818,500	3,694,000	7,704,600	939,500	19,959,600
Miscellaneous	....	....	....	....	....	....	....
Total	$34,223,700	$75,930,800	$44,184,800	$57,318,400	$169,323,100	$13,996,800	$394,977,600



More Garages Every Day

Automobile ownership is on the increase, which means more garages of every conceivable type are going up every day.

This opens up a large field of operations for the builder who is awake to profitable opportunity.

Private garage equipment such as the NATIONAL Garage Door Set is in demand. Doors equipped with these sets operate with greater ease, never stick or bind, are adjustable in the event of door swelling or raising of floors, provide easy and free access to the garage at all times.

Our garage plan booklet will interest any architect or builder and may be had free on request.

NATIONAL MANUFACTURING COMPANY
STERLING, ILLINOIS

National
Garage Door Sets

Trend of Material Prices

THE following are wholesale prices of basic building materials in the three markets which set prices for the rest of the country.

These prices are presented to show the trend of the wholesale market, which forecasts prices in the retail market. They are not prices which the average contractor can buy at, but are quoted to show him the movement of materials so that he can buy to better advantage.

Followed in conjunction with the Review of Building Conditions, these prices will prove invaluable.

All prices are for carload lots, F. O. B. market quoted, unless otherwise noted.

NEW YORK PRICES

	Oct. 21	Nov. 18
LONG LEAF YELLOW PINE		
B. and Better Edge Grain Flooring, 2½" Face	.....	$87.00
Dimension, S1S1E, No. 1 Common, 2x4", 10'	38.00	42.50
Timbers, Merchantable, '05, 12x12", 10 to 20'	50.00	50.50
B. and Better Ceiling, ½x3¼	41.00	42.50
B. and Better Finish, 1x4"	62.50	64.00
No. 1 Common Boards, 1x8"	41.00	42.00
NORTH CAROLINA PINE—		
No. 2 and Better Flooring, 13/16x2½"	$65.00	$67.00
Roofers, 13/16x5½"	31.50	31.50
DOUGLAS FIR—		
No. 2 Clear and Better V. G. Flooring, 1x3"	$78.50	$78.50
No. 1 Clear V. G. Flooring, 1x4"	76.00	76.00
No. 2 Clear and Better Ceiling, ⅝x4"	43.00	43.00
No. 2 Clear and Better Novelty Siding, 1x6"	52.25	52.25
No. 2 Clear and Better V. G. Stepping	90.00	90.12
Dimension, S1S1E, 2x4", 16'	40.00	40.00
Timbers, S1S1E, 12x12", 16'	54.00	54.00
WESTERN RED CEDAR—		
B. C. Perfection Shingles, per M	$7.70	$7.60
Washington Perfection Shingles, per M	7.35	7.20
Clear Bevel Siding, 1½x6"	48.00	44.50
CANADIAN SPRUCE—		
No. 1 Lath, 1½"	$10.38	$9.50
Dimension, 2x4", 10 to 16'	34.00	34.00
HARDWOOD FLOORING—		
Clear Quartered White Oak, 13/16x2x2¼"	$137.50	$147.50
Clear Plain White Oak	97.50	105.00
Clear Maple, 13/16x2¼"	96.50	95.50
Clear Quartered White Oak Parquetry Strips, 5/16x2"	142.50	142.50
Clear Plain White Oak Parquetry Strips	87.50	87.50
(All lumber prices furnished by **LUMBER**)		
COMMON BRICK—		
Per M. f. o. b. job	$18.40	$17.50
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers, f. o. b. dock	$2.60	$2.60
STRUCTURAL STEEL (IRON AGE)—		
Per 100 lb. to large buyers	$2.88	$2.75
CRUSHED STONE (cu. yd.)—		
¾ in.	$2.75	$2.90
1½ in.	2.60	2.75
WALL BOARD—		
Per 1,000 sq. ft. in lots under 1,000 sq. ft.	$52.50	$60.00
Per 1,000 sq. ft. in lots 1,000 to 2,500 sq. ft.	47.50	55.00
METAL LATH—		
2.3 lb.—warehouse price per 100 sq. yd.	$22.64	$25.95
2.8 lb.—warehouse price per 100 sq. yd.	26.60	24.40
3.4 lb.—warehouse price per 100 sq. yd.	29.33	30.35
Add 5 cents per sq. yd. for galvanized.		
LIME (Hydrate)—		
Finishing, per 50 lb. bag	.....	$0.60
Masons, per 50 lb. bag	.....	.45
SAND AND GRAVEL (cu. yd.)—		
Sand	$1.50	$1.50
¾ in. gravel	2.75	3.00
1½ gravel	2.75	3.00

CHICAGO PRICES

	Oct. 21	Nov. 18
YELLOW PINE—		
Boards, 1x8, No. 1 Com	$36.00	$37.00
Casing and Base, 6-8 in.	.....	70.00
Ceiling, ⅝x4, B. and Btr	40.50	44.50
Dimension No. 1, 2x4, 12 to 14 ft	33.00	33.00
Drop Siding, 1x6, B. and Btr	43.00	42.50
Finish, 1x4, B. and Btr	54.50	61.50
Flooring, B. and Btr. E. G., 1x3	78.00	80.00
Lath, 4 ft., No. 1	7.55	8.50
Timbers, Long Leaf No. 1, 10-20 ft., S4S, 6x12 to 12x12.	38.00	41.00
NORTHERN HEMLOCK—		
Boards, No. 1, 8 to 16 ft., 1x6 to 8 in.	$29.00	$30.50
Lath, 4 ft., No. 1	9.25	9.75
DOUGLAS FIR—		
Boards, No. 1, S2S, ¾ in., 1x8 to 10 in.	$29.25	$29.75
Dimension, No. 1, S1S1E, 8 ft., 12 ft., 14 ft., 2x4 in..	29.50	29.50
Drop Siding, 1x6 Pat. 106, No. 2, C. and Btr	45.50	42.50
Flooring V. G., 1x4, No. 1	69.50	68.50
Lath, 4 ft., No. 1	8.50	8.50
Timbers, No. 1 Com., 12x12 in. and under, 40 ft. and under, rough	37.00	37.00
HARDWOODS—		
Maple Flooring, 13/16x2¼, clear	$90.00	$90.00
Oak Flooring, 13/16x2¼, Cl. Pl., White	104.00	104.00
REDWOOD—		
Bevel Siding, S1S1E, 10 ft., 20 ft., ½x4, clear	$38.25	$38.25
Finish, S2S or S4S, 1x6 to 8 in.	81.50	81.50
WESTERN RED CEDAR—		
Bevel Siding, ½x4 in., Clear	$43.00	$43.00
Shingles, Extra Clears, 16 in.	5.20	4.50
COMMON BRICK—		
Per M. f. o. b. job	$12.00	$12.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers	$1.97	$1.97
STRUCTURAL STEEL—		
Per 100 lbs. to large buyers	$2.88	$2.78
CRUSHED STONE (cu. yd.)—		
¾ in.	$1.75	$1.75
1½ in.	1.75	1.75
WALL BOARD—		
Per 1,000 sq. ft. in lots under M	$57.50	$60.00
Per 1,000 sq. ft. in lots 1 M to 2½ M	52.50	55.00
SAND AND GRAVEL (cu. yd.)—		
Sand	$1.75	$1.75
¾ in. gravel	$1.75	1.75
1½ in. gravel	1.75	1.75

ST. LOUIS PRICES

YELLOW PINE—		
Boards, No. 1 Com. 1x4	$30.50	$32.50
Partition, ¾x3¼, B. and Btr	53.00	56.25
Dimension, No. 1, S1S1E, Short Leaf, 2x4 in., 12 & 14 f	30.50	30.50
Finish, S2S, B. and Btr., 1x4	56.00	59.00
Flooring, B. and Btr., E. G., 1x3	77.25	77.25
Flooring, B. and Btr., F G., 1x3	63.25	65.25
Lath, 4 ft., No. 1	7.25	6.75
Timbers, No. 1, rough, short leaf, 6x12 to 12x12 in., 10 to 20 ft	36.00	35.00
DOUGLAS FIR—		
Ceiling, F. G., ⅝x4 in., No. 2, Cl and Btr	$36.25	$36.25
Dimension, No. 1, S1S1E, 2x4 in., 8, 12, 14 ft	29.00	29.00
Drop Siding and Rustic, 1x6 in., No. 2, Cl and Btr	43.50	43.50
Finish, F G., S2S or S4S, 1x4 in, No. 2 Cl. and Btr	[illegible]	64.25
Flooring, 1x4 in., No. 1, Cl., V.G.	65.50	63.50
Stepping, V.G., 1¼x10 in. & 12 in., No. 2, Cl. & Btr.	.....	79.75
CALIFORNIA REDWOOD—		
Finish, S2S, Cl., 1x6 in.	$81.50	$81.50
Siding, 4 in. Bevel, 10 to 20 ft.	38.25	38.25
8 inch Colonial	66.75	66.75
8 inch Bungalow	68.75	68.75
HARDWOODS—		
Oak Flooring, ⅜x1 and 2 in., Clear Qtr. White	$91.75	$91.75
Maple Flooring, 13/16x2¼ in., Clear	110.00	111.50
RED CEDAR—		
Siding, ½x6, Clear	$41.00	.....
Shingles, Clears	4.96	4.41
COMMON BRICK—		
Per M. f. o. b. job	$17.00	$17.00
PORTLAND CEMENT—		
Bbls. in car lots to contractors, not including containers	$2.25	$2.20
STRUCTURAL STEEL—		
Per 100 pounds to large buyers	2.98	2.97
CRUSHED STONE (cu. yd.)—		
¾ in.	$1.825	$1.83
1½ in.	1.825	1.83
WALL BOARD—		
Per 1,000 sq. ft. in lots under M	$57.50	$60.00
Per 1,000 sq. ft. in lots 1 M to 2½ M	52.50	55.00
SAND AND GRAVEL (cu. yd.)—		
Sand	$1.40	$1.20
¾ in. gravel	1.40	1.30
1½ in. gravel	1.35	1.25
FACE BRICK—		
Tapestry (delivered)	.....	$45.00
Caledonian (delivered)	.....	46.00
Smooth Grey (Delivered)	.....	47.00
Fisk Lock F. O. B. Factory	35.50	32.50
SHINGLES (per square)—		
Asphalt single	$6.40	$7.00
Asphalt strip	5.75	6.50
STAINED WOOD SHINGLES (per square)—		
16 in. extra clear	$9.75	$10.00
18 in. Eureka	10.50	10.10
18 in. Perfection	11.50	11.00
24 in. Royal	11.40	10.50
24 in. Imperial	12.00	11.10

Kodak Pictures of the Job

Construction methods, equipment used, progress of the work from day to day—you can keep track of them easily with a Kodak on the job. Daily negatives, each dated and titled at the time of exposure, make a progress record that is accurate and indisputable.

Engineers and builders favor the 3A Kodaks, which make pictures $3\frac{1}{4}$ x $5\frac{1}{2}$ inches. 3A Kodaks are priced at $19.00 and up, and all have the autographic feature.

EASTMAN KODAK COMPANY

ROCHESTER, N. Y., *The Kodak City.*

Legal Department

The Architect or Builder As an Expert Witness

THE existence of a legal cause of action and *proving* it are two widely different things. Mr. Doe, an attorney, recognized this when Mr. Roe, a client, complained that while passing under the window of a financially irresponsible enemy a bucketful of paint had mysteriously fallen all over him. Doe gave this as his advice, which was as sound as it was terse: "If you have witnesses it is assault and battery; otherwise, it is a misfortune!"

The testimony of the builder or the architect may be the turning point in a lawsuit in which he appears as a witness on his own behalf or that of another. And since it is a matter of daily occurrence for builders and architects to be called into court as expert witnesses, it should prove to be a matter of general interest to understand the more important legal aspects of their testimony.

When any expert witness is permitted to express an opinion there is a departure from the general rule that witnesses are to be permitted to testify to *facts* only; it being the province of the judge or jury hearing the case to draw conclusions. This departure is permitted under an exception to the general rule—an exception that must be made in view of the fact that jurors are not supposed to be able to apply expert knowledge to some facts presented to them. They may know that driving an automobile along a crowded city street at 45 miles an hour is unsafe; thereby making it improper to have witnesses express opinions to that effect. But it does not follow that testimony concerning the details of given building construction will enable jurors to draw conclusions as to whether it has been properly or improperly done, without the aid of expert opinions.

So, in the case of Long vs. John Breuner Co., 172 Pacific Reporter, 1132, a case involving a question as to whether an inclined approach to a store entrance had been negligently constructed on too steep a grade, thereby causing a pedestrian to fall, it was decided by the California District Court of Appeals that it was proper to permit an architect to testify that the usual grade was three per cent. and that ten per cent. was the greatest approved grade.

ALL readers are invited to ask any questions that will help them solve any legal difficulty that they may be in. Our legal adviser will answer direct by mail and give his opinion as to the correct procedure. Questions and answers of general interest to the trade will be published in these columns. All inquiries must be accompanied by the name and address of the correspondent so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nome de plume. Remember that this service is free to subscribers. Address Legal Department, Building Age, 920 Broadway, New York City.

And a standard legal authority has made this summary of the law in the United States concerning the admissibility of expert testimony relating to the building trades:

"The proper manner of conducting ordinary building operations, the time required therefor, the cost thereof, the life, strength, and other characteristics of building materials, including their adaptability for certain purposes, and the effect produced upon them by decay or heat, may be stated by a witness skilled in the particular line involved in the inquiry, unless the fact is one within the special function of the jury to determine. A builder may state what forms of construction would be covered by a certain designation, and a gas fitter may testify whether gas meters are usually classified as gas fixtures. Testimony as to whether it was possible for an employee, walking on a girder during the erection of a building, to pass a brace without taking hold of it, has been held competent." 22 Corpus Juris, 538.

In the case of Nelson vs. Young, 87 New York Supplement, 69, it was held that a skilled witness might testify whether 27 feet was an unusual span in building. But in the Thompson Case, 12 New York Supplement, 182, it was declared that a carpenter not otherwise qualified could not state the effect on a building of the concussion of blasting 100 feet below the surface of the ground.

The Massachusetts Supreme Judicial Court decided in Hall vs. Thayer, 113 Northeastern Reporter, 644, that an expert was properly permitted by the trial judge to testify that the foundations of a tank, which fell causing injuries for which plaintiff sued, were not "a good form of construction." And the New York Supreme Court, Appellate Term, declared in the case of Levy vs. Tiger, 90 New York Supplement, 366, that an architect was qualified to express an opinion as to the necessity for shoring a certain building.

In the case of Frost vs. King, 167 North western Reporter, 494, the South Dakota Supreme Court approved a trial judge's action in permitting a building contractor to testify that he finished a house "in a good, workmanlike manner." And the Springfield, Md., Court of Appeals, held, in the case of Moore vs. McCutchen, 190 Southwestern Reporter, 350, that a carpenter of 30 years' experience was qualified to testify concerning the cost of repairing plastering on a building on which he had worked, although he was not an expert plasterer.

It has been held by the New York Court of Appeals that persons who have made a special study of the strength of materials and the proper mode of building structures to sustain weights may testify whether a structure has been built sufficiently strong to withstand the strain which would be put upon it in using it for the purpose for which it was intended. (Fox vs. Buffalo Park, 57 Northeastern Reporter 1109.) And the California Supreme Court has decided that an expert builder may give an opinion as to the weight of timber, the amount of the strain to which a given piece of timber can be subjected before breaking, the difference of resistance of such strain between a cylindrical kind of lumber, etc. (Callan vs. Bull, 45 Pacific Reporter 1017.)

Where a question was raised in a lawsuit whether a builder had constructed a

The Guardian of Countless Homes

NATCO Residence at West Bethlehem, Pa
C. E. Schermerhorn, Phila. Pa. Architect

SINCE 1889 Natco Hollow Tile has been guarding a steadily increasing number of America's most successful homes against heat, cold, dampness and discomfort of all kinds. Over a period of thirty years Natco Hollow Tile has proven its trustworthiness and economy as a building material. You, as a Natco dealer will be sure to profit by the proven integrity and popularity of Natco Hollow Tile when the building boom begins. It will pay you to get into line before next spring and get your share of the Natco business in your territory.

Write for our interesting proposition today.

National Fire Proofing Co.
1426 Fulton Building Pittsburgh, Pa.

NATCO HOLLOW TILE

building in a skillful and workmanlike manner, it was proper to refuse to permit a witness who had examined the house to testify whether there were defects in the construction, if the witness had not first shown his qualifications to give such opinion. (Massachusetts Supreme Judicial Court, Campbell vs. Russell, 1 Northeastern Reporter 345.) And it was declared by the Delaware Superior Court that a builder and contractor who had had no experience in the construction of buildings where heavy machinery is used was not qualified to give his opinion merely from an examination of such a building as to whether it was suitable for the purpose for which it was constructed. (Huber vs. Jackson & Sharp Company, 2 Hardesty 97.) In a New York case architects were held to have been properly permitted to state whether an unprotected furnace pit in a cellar was properly constructed. (Behsmann vs. Waldo, 74 New York Supplement 929.) And, in the same state, the Court of Appeals decided that an architect was properly permitted to give an expert opinion as to whether certain work could be done within a certain time without dangerous haste.

The status of architects and builders as expert witnesses was recognized by the Missouri Supreme Court in the case of Turner vs. Haar, 21 Southwestern Reporter 737, but it was decided in that case that witnesses were improperly permitted to given opinions that a wall might have cracked as the result of defects in it or the foundation, since it appeared that the cause of the cracking was susceptible to direct proof. The court said: "These witnesses were shown to have been engaged in the business a number of years, and are presumed to have acquired special knowledge of the business. Their knowledge, skill and experience were not tested further by cross-examination, and we think they were prima facie qualified to give their opinion on any question in respect to the construction, strength and sufficiency of proper subject for opinion evidence.

"The opinion asked of these expert witnesses as what produced the crack between the walls would have been proper enough in an issue involving the effect upon the wall a sinking of the foundation would have produced; but in the issue here the condition of the walls, and the sufficiency or insufficiency of the foundation, were facts susceptible to direct proof; and it was improper to get before the jury, as proof that the wall was defective, or the foundation had given away, an opinion that the separation of the walls may have resulted from these facts and conditions."

Before an architect or builder will be deemed qualified to give an opinion based on facts, a knowledge of which he derives from other witnesses, he must, of course, be put in possession of all the facts, as ascertained or supposed, on the question about which the inquiry is made. An opinion given upon a partial statement of facts would be of no value. Applying this principle, the Missouri Supreme Court said in the case last cited: "What effect the vibrations caused by running the machinery on the third floor may have had in weakening the building and rendering it insecure and dangerous, was certainly a subject beyond the general knowledge of mankind, and a proper one for opinion evidence. In this case, however, the evidence was worthless, and improperly admitted, for the reason that the witnesses were not put in possession of all the facts necessary to enable them to form an intelligent opinion. The answer of one of the witnesses, 'If the vibration was great enough it would throw the building down,' forcibly illustrates the importance of the rule that requires an opinion of a witness to be predicated upon all facts which may influence it."

In an Illinois case, plaintiffs, architects, sued to recover damages on the theory that they were wrongfully prevented by the owner from performing services contracted for. For the purpose of showing that plaintiffs were by the contract claimed to have been made with the defendant to superintend the construction of the building, they introduced evidence to prove a custom that the employment of an architect to make plans and designs for a building carried with it an employment to superintend the construction. In this situation it was held by the Illinois Supreme Court to have been improper on the part of the trial judge to exclude testimony offered by defendant owner's witnesses, who were builders and contractors, to show that there was no such custom. Speaking of the qualifications of these witnesses, the Supreme Court said: "The witnesses . . . had been largely engaged in building and contracting in Chicago, and if there was such a custom they must have known of it. It could not be wholly confined to architects, but must, if it existed, be just as well known to builders and contractors, without whom there could be no opportunity for the existence of the custom. The concurrence of the builder or contractor was just as essential as that of the architects. It was not to be settled by special skill or science, but by a knowledge of what the architects did under a particular form of employment, and anybody who had any experience in the matter was competent to testify." (Wilson vs. Bauman, 80 Illinois Supreme Court Reports 493.)

Right of Builder to Abandon Work Because of delayed installments

An opinion of the Pennsylvania Supreme Court seeks to draw a line between those instances where a builder or subcontractor may validly abandon a contract because of default on the part of the other party in making payments and those instances where he may not. In this case—Turner Concrete Steel Company vs. Chester Construction & Contracting Company, 114 Atlantic Reporter, 780, it is decided that a subcontractor under an $800,000 contract was not justified in abandoning it within a few hours after the principal contractor had paid a large sum, claiming that that was all that was due but offering to immediately pay any additional sum that might be shown to be due. In the course of its opinion the court says:

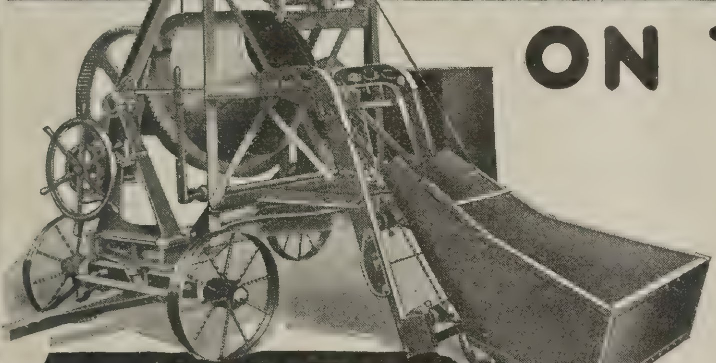
"In contracts such as this, where the work is spread over a considerable period of time, and large sums of money must necessarily be expended by the contractor, and payments are based on the amount of work performed, the covenant to perform is dependent upon the covenant to pay. A failure to liquidate installments as they come due may justify the rescission of the contract and the abandonment of the work. 'In such cases a substantial compliance as to advance payments is a condition precedent to the contractor's obligation to proceed.' Guerini Stone Co. v. V. P. J. Carlin Construction Co., 248 U. S. 334, 345, 39 Sup. Ct. 102, 106 (63 L. Ed. 275). 'But, of course, the builder is not entitled to rescind and abandon the contract unless there has been some wrongful act or default on the part of the owner, as where the delay in payment is a reasonable one, or the amount due is disputed.' 9 C. J. 726. . . . Of course, if there is no honest dispute, the contractor may rescind, if in so doing he acts reasonably. Such was the situation in Harton v. Hildebrand, 230 Pa. 335, 79 Atl. 571, where the claim had been admitted in writing to be correct, and was long overdue. On the other hand, where it appears the builder is not acting in good faith, the contrary will be held. Grunwald v. Hahn, 176 Pa. 37, 34 Atl. 972; Gibbs v. Girardville School District, 195, Pa. 396, 46 Atl. 91.

"In the present case there was an apparently bona fide contention as to the sum due." Therefore a builder has the right to stop work if there is a delay in paying him the installments agreed upon when they become due.

Departures from Building Contract Hold Back Payments

A CALIFORNIA building contract contained a clause requiring the owner to serve on the contractor a written statement of defects claimed by the former to exist in the work. To a suit brought by the contractor to recover an unpaid balance on the contract price, the owner replied that the builder had deliberately departed from the terms of the contract, covering materially defective construction, thereby defrauding the owner into paying more than was fairly due under the contract. The California Supreme Court, finding that the contractor had practiced the fraud charged by defendant, holds that the latter's failure to serve a written statement of defects did not preclude him from relying upon them in defense of the contractor's claim that he had not been fully paid.

WONDERS ARE DEPENDABLE



ON THE JOB!

**ASK THE LOCK-JOINT PIPE CO.
EAST ORANGE N.J.
WHO ARE STILL OPERATING
WONDER MIXERS
PURCHASED IN 1912**

THE Lock Joint Pipe Company operate 60 Wonder Mixers on the most exacting class of work that a Mixer is called upon to do.

Miles of pipe are laid, and the pipe are made on the job. Thousands of dollars are invested on plant equipment, a small army of men are engaged, and Wonder Mixers pour the perfectly mixed material that spells the success or failure of the day's operation. No time here to coax a complicated set of buckets and shovels to discharge the mixed aggregate.

Here no chances can be taken on "sight and unseen" mixing action. The mixture must be visible and under complete control at all times. The pipe must stand up under a terrific water pressure so each batch must be right before discharge.

Although your work may not be so exacting as the above, nevertheless when you buy a Wonder you, too, will have these same features of Wonder dependability and Wonder durability.

And the price? Ask us.

CONSTRUCTION MACHINERY CO.

FORMERLY WATERLOO CEMENT MACHINERY CORPORATION

403 Vinton Street Waterloo, Iowa

New Catalogs and Publications

817. **Fireplace Fixtures** are illustrated and described in the catalog of Stover Manufacturing and Engine Co., Freeport, Ill. Some interesting information is given about building open fireplaces, proper size of flues and the dimensions required to obtain a proper fireplace.

818. **Woodworking Machines** is the tile of a catalog describing the different machines made by the Sidney Machine Tool Co. of Sidney, Ohio. Many of these machines would prove money savers for the building contractor to have in his shop and on the job.

819. **Casement Windows** need to be held open and closed tightly and require special hardware. The Monarch Metal Products, 4121 Forest Park, Boulevard, St. Louis, Mo., issue a catalog describing Monarch Casement Window Hardware.

820. **Waterproofing Concrete & Brick** is described in a booklet published by Wadsworth, Howland & Co., of Boston, Mass. It describes their prepared coating and the methods of its use in making cement and brick surfaces impervious to moisture.

821. **Books for Builders.** A special list of useful books for architects, builders, carpenters, etc., has been issued by the Arrow Book Co., 347 Fifth Ave., New York. Mr. Edward P. Von Gough is the president. He was formerly manager of U. P. C. Book Co., which specialized in books along this line, and therefore is well able to advise the best book to buy on a certain subject.

822. **Lighting Standards** and Metal Columns are made by Union Metal Mfg. Co., Canton, Ohio. They issue two catalogs, profusely illustrated with complete details of small house and apartment house lighting standards and architectural correct metal columns. Instructive and interesting.

823. **Building Instruction.** It is announced that courses of instruction for the study of steel square problems, roof framing and stair building will be conducted by Pratt Institute beginning January 2, 1922. Circulars of information will be mailed to readers of BUILDING AGE upon request of Pratt Institute, 215 Ryerson street, Brooklyn, N. Y.

824. **American Saw Mill Machinery Company** of Hackettstown, N. J., have issued an interesting illustrated catalog describing their portable variety woodworker, which, as its name indicates, can be moved from job to job.

825. **Dumb Waiters and Elevators** are described in a catalog on this useful addition to a modern house. It is issued by the Sedgwick Machine Works Inc., 150 West 15th street, New York, and will be sent to interested parties.

THESE catalogs may be secured direct from the manufacturer. If you prefer, write the date of this issue and the numbers of any catalogs on a postal and mail it to "Building Age," 912-920 Broadway, New York City. The catalogs will be sent you without charge, unless otherwise noted.

826. **Hollow Tile Construction** is practically explained in a well illustrated book prepared by National Fire Proofing Co., Pittsburgh, Pa. Data regarding the different hollow tile blocks are given and construction details show how they are used for walls and floors and how special requirements are met.

827. **Hand Book on Mixing Concrete** gives practical directions on the subject and will be sent to any interested party by the Construction Machinery Company, Waterloo, Iowa. It also describes the use of the "Wonder" concrete mixers, block machines, and brick machines.

828. **Shingles That Last** is the title of an interesting catalog just issued by National Sheet Metal Roofing Co., 339 Grand street, Jersey City, N. J., describing metal shingles that are rust proof and fireproof. Illustrations show many beautiful effects that can be obtained. A special shingle is made in the pattern of Spanish tile, with the proper ridges, hips and finials.

829. **Sash Cord** is a detail of considearble importance to the builder. Valuable data, also samples of different sizes of Samson Spot Sash Cord, may be had from the Samson Cordage Works, 88 Broad street, Boston, Mass. They have issued an interesting booklet.

830. **Thatched Roof Effects** can be secured by the use of wood shingles. An interesting book on this subject has been issued by the Creo-Dipt Co., North Tonawanda, N. Y. In it are shown pictures of various houses with artistic roof effects. Details showing the exact construction required to obtain these effects are also given.

831. **Compo Board** uses are tersely described and well illustrated in a recent booklet issued by the Compo-Board Co., Minneapolis, Minn. A copy, together with a sample, will be sent to anyone interested.

832. **Picture Making** is of practical value to the building trades. How to do it, the necessary cameras, films or plates, etc., are described in the booklets and catalogs issued by the Eastman Kodak Co., Rochester, N. Y.

833. **Copper Leaders,** etc., for building purposes are described, illustrated and priced in the folder issued by C. G. Hussey & Co., Pittsburgh, Pa. The specialties they manufacture from copper include leaders, eaves, troughs, elbows, shoes, nails and sheet copper for flashing, etc.

834. **Gas Heaters** that will flood your room with a glowing radiant heat in one minute after lighting are described in the catalog of the General Gas Light Co., Kalamazoo, Mich., the manufacturers of the Humphrey Radiantfire.

835. **Asbestos Roofing, Insulation,** etc., are the products manufactured by the Johns Manville Co., Inc., Madison Ave., corner 41st St., New York. They will be glad to send special catalogs describing their various varieties of shingles, siding, pipe covering, etc.

836. **California Redwood's** many special uses are illustrated and described in the literature of the California Redwood Association, Exposition Building, San Francisco, Cal. They will be glad to send complete information, prices and specifications to any contractor or architect so that they can give the information about this wood that a prospective home builder will most likely ask.

837. **Fireproof Doors** are described in the catalog of A. C. Chesley Co., 6704 East 133d St., New York. They are the makers of the Chesley Standard Fireproof Doors, which are light in weight, can be finished to harmonize with interior trim, and are kept in stock in standard sizes and furnished at a price but little more than wood doors.

838. **Store Front Construction** is shown in the catalog and special blue prints issued by J. W. Coulson & Co., 95-107 West Spring St., Columbus, Ohio. An interesting form of construction is shown that will protect the glass from breakage besides the other necessary provisions for drainage, ventilation, awnings, etc.

839. **Decorative Concrete,** to imitate different kinds of marble, can be made by the process employed by the Art Stone Co., Waynesboro, Pa. They will gladly send a descriptive circular to any one interested.

840. **Beaver Board** and its use for remodeling jobs and other work that can be done in the winter is the subject for an interesting circular issued by the Beaver Board Companies, Buffalo, N. Y. They have a special service for builders offering helps in the way of specially prepared sketches which can be submitted with a bid—it helps to land the order.

Turning December Into A Busy Mon

The Sheetrock builder knows how to keep busy even in midwinter. He finds, ready at hand, scores of remodeling and repair jobs. Vegetable cellars, furnace rooms, attics, garages, stores and offices—all these he quickly and easily walls and ceils with Sheetrock, the fireproof wallboard.

Sheetrock, due to the special U.S.G. process, can be sawed like lumber. It is nailed directly to the joists or studding, and is then ready, without the slightest delay, for the decorating—wallpaper, paint, panels or calcimine. The new Sheetrock finisher conceals the joints and the nail heads and positively prevents discoloration.

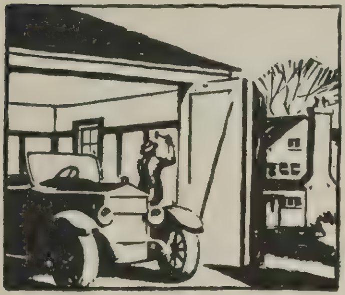
Made from rock, Sheetrock is not only fireproof; it can not warp, shrink or buckle. And its tight-jointed, thick, tough surface insures a great saving in fuel.

Get your share of the December remodeling business. Keep busy straight through the winter. You can do it by letting the home and building owners of your community know about the merits of Sheetrock.

For a sample of Sheetrock and our plan to help you get Sheetrock jobs fill out and mail the attached coupon.

Sheetrock comes in standard sizes: 3/8 inch thick, 32 or 48 inches wide and 6 to 10 feet long

USG



SHEETROCK

The FIREPROOF WALLBOARD

UNITED STATES GYPSUM COMPANY

World's Largest Producers of Gypsum Products

General Offices: Dept.H, 205 W. Monroe Street, Chicago, Ill.

SALES OFFICES

New York, N. Y., Buffalo, N. Y., Boston, Mass., Washington, D. C., Philadelphia, Pennsylvania, Pittsburgh, Pennsylvania, Cleveland, Ohio, Cincinnati, Ohio, Detroit, Michigan, Milwaukee, Wisconsin, Minneapolis, Minnesota, St. Louis, Missouri, Kansas City, Missouri, Omaha, Nebraska, Denver, Colorado, Los Angeles, California

MINES AND MILLS

Oakfield, N. Y., Plasterco, Va., Cleveland, Ohio, Gypsum, Ohio, Genoa, Ohio, Detroit, Michigan, Alabaster, Michigan, Grand Rapids, Michigan, Milwaukee, Wis., Fort Dodge, Iowa, Blue Rapids, Kansas, Southard, Okla., Eldorado, Okla., Piedmont, S. D., Loveland, Colo., Denver, Colo., Arden, Nev., Amboy, California

Sheetrock is inspected and approved by The Underwriters' Laboratories, Inc.

UNITED STATES GYPSUM COMPANY
Dept.H, 205 West Monroe St., Chicago, Ill.

Send me complete information about Sheetrock.

Name ____________________

Address ____________________

841. **Bishopric Sheathing** is tersely described and its uses shown in an interesting catalog issued by The Bishopric Mfg. Co., 17 Estes Ave., Cincinnati, Ohio. This will be sent free to any one interested in building stucco houses. It is entitled "Bishopric for All Time and Clime."

842. **Waterproof Canvas** for the covering of roofs and floors of piazzas, sun parlors, sleeping porches, etc., is interestingly explained in the circular of Bayonne Roof & Deck Cloth issued by John Boyle & Co., Inc., 112 Duane St., New York. They will send samples to interested parties.

843. **Steel Sash and Window Frames** for the use of even the smallest dwelling are described in the new catalog issued by Henry Hope and Sons, 103 Park Ave., New York. This gives plans and photographs of cottages in which steel windows are used, they are made in standard sizes and of various designs for masonry and frame construction.

844. **Heating Specialties to Produce Perfect Steam Circulation** are described in the new catalog of the Bishop and Babcock Co., of Cleveland, Ohio. They make different regulating valves, steam traps, damper regulators, oil separators, reducing valves, etc.

845. **A Plan Service** for builders which includes working drawings, specifications, bill of materials and a cardboard model in colors furnished by the Architectural House Planning Service Co., 20 E. 18th St., Philadelphia, Pa. They issue a book for one dollar which shows fifty attractive small homes.

846. **Resurfacing Old Floors** is work that can be done in the winter. Full particulars about a machine to do this can be obtained from the catalog issued by The American Floor Surfacing Machine Co., 521 S. St. Clair St., Toledo, Ohio.

847. **Redwood and Its Uses** in building construction is fully described in a booklet entitled "Architectural and Building Uses" issued by The Pacific Lumber Co., 2070 McCormick Building, Chicago. A copy will be sent to any builder who is interested.

848. **The Mixing of Concrete** is more economically done if one has the proper equipment. The Ransome Concrete Machinery Co., 1774 Second St., Dunellen, N. J., have just issued an interesting catalog describing their line of concrete mixers, etc.

849. **Handy Auto Trailer** for contractor's use made of steel is described in the catalog of Rogers Bros. Co., Albion, Pa. They make these trucks of different sizes and types to meet the special requirements of the building contractor.

850. **Woodwork for Better Homes** is specially described in the catalogs of the Morgan Sash & Door Co., Chicago. They have issued a large book entitled "Building with Assurance" which is supplied to retail lumber yards for cooperative use with building contractors. They will be glad to send to any one interested an illustrated prospectus telling about the service they are ready to give the contractors.

851. **Roofing Tin,** its uses, and proper laying, etc., is described in the booklet issued by the N. & G. Taylor Co., of Philadelphia. Samples of the various thickness can be had and makes the selection of the right sort an easy and sure matter. This concern makes the well-known Target and Arrow Brand.

852. **Wall Ties** are necessary for brick, concrete and stone construction. A very good form is the "Herringbone," which is made of heavy galvanized metal by the Merwin Mfg. Co., Erie, Pa. They will be glad to send a sample and prices.

853. **Garage Hardware** of the right sort will enable the builder to produce a satisfactory job of the swinging of the doors, etc. The National Manufacturing Co., Sterling, Ill., manufactures a varied line of "National" garage door sets and have an interesting illustrated catalog which they will send to any one interested.

854. **Drafting Furniture,** drawing instruments, blue print paper, etc., are described in the new illustrated catalog of the New York Blue Print Paper Co., 102 Reade St., New York. They have a circular on a set of drafting instruments on which they are making a special price.

855. **Tools for Carpenters** and other mechanics are described in the "Yankee" Tool Book issued by North Bros. Mfg. Co., Lehigh Ave., Philadelphia, Pa. They manufacture many handy special tools, amongst which is the well-known screw holder ratchet driver.

856. **Mineral Wool** is useful for insulating outside walls of frame struitures and between floors and partitions for sound deadening. It is manufactured by the U. S. Mineral Wool Co., 280 Madison Ave., New York, and they will be glad to send full particulars to any one interested.

857. **Vulcanite Roofing** is described and illustrated in an instructive folder issued by the manufacturers — the Beaver Board Companies, Roofing Division, Buffalo, N. Y. They make an asphalt shingle in hexagon design that is easily laid, as it is in slab form.

858. **Trade Marked Lumber** is the new departure of the Weyerhauser Forest Products, St. Paul, Minn. Their service department will be glad to give information regarding the qualities of the different species of wood and the best to select for a given purpose. This service is free to home builders, architects and contractors.

859. **Blue Print Machine.** Full details regarding the making of blue prints rapidly and economically besides having them good may be learned from the catalog of Wickes Brothers, 1301 Water St., Saginaw, Mich.

860. **Ambler Asbestos Shingles** are illustrated and described in a catalog just issued by the Asbestos Shingle, Slate and Sheathing Co., of Ambler, Pa. Full directions for proper laying are given. They also manufacture asbestos building lumber and asbestos wall board.

861. **Measuring Tapes,** levels and drawing instruments are fully described and priced in the new catalog of Keuffel & Esser Co., Hoboken, N. J. They also carry a line of drawing paper, etc., and make blue prints for architects and builders.

862. **Recessed Ceiling Light** for auditoriums, corridors, gymnasiums, etc., is manufactured by the L. P. T. Specialty Co., Madison Terminal Building, Chicago. They will be glad to send data and prices to any one interested.

863. **"From Tree to Trade"** is an interesting book telling the story of lumber manufacture from the woods to the finished product. It will be of value to builders and architects. Issued by The Long Bell Lumber Co., Kansas City, Mo.

864. **Fiberlic** is the name of a wall board made of wood fibers by the MacAndrews & Forbes Co., 200 Fifth Ave., New York. They have an illustrated catalog describing their product and how to use it for covering walls, making screens, boxes, etc. A sample of the wall board will also be sent to interested parties.

865. **Plan Reading** is one course of study that is given by the Correspondence method by the Chicago Technical College, 1038 "Tech" Building, Chicago. They will be glad to send a valuable lesson in Plan Reading free to any of our readers who are interested.

866. Lightning Protection is a necessity in many sections more than in others, but no place is free from this danger. In the interesting booklet of N. C. Shinn Mfg. Co., 1231 Lytton Building, Chicago, Ill., they describe flat cable of woven copper wires for protection from lightning and give directions of how and where to apply on barns and houses.

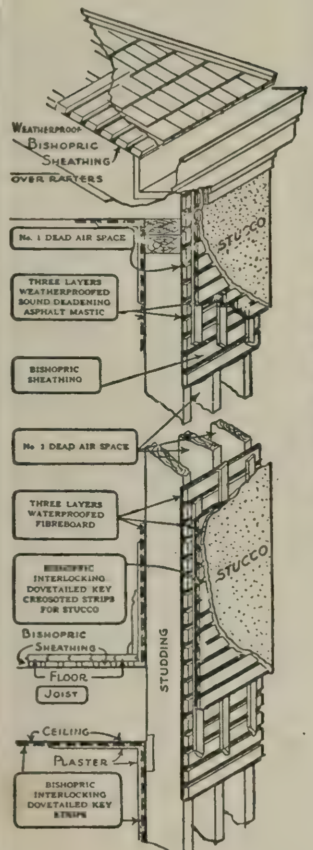
867. **Wire Rope** plays a very important part in the erection of any large building and the contractor should know what kind of wire rope is being used to hoist his materials and protect the lives of his men. The Williamsport Wire Rope Company, Peoples Gas Building, Chicago, Ill., have made a new departure by having tape markers woven in the core of the wire rope they manufacture, so that any user can tell what grade of wire rope it is. They will send an interesting book on the use of wire rope and their "Telfax" color chart.

A stucco house built of

BISHOPRIC

The Super Stucco-Plaster Base

is enduring—with no "cost of upkeep"


Weatherproof Bishopric Sheathing over Rafters
No. 1 Dead Air Space
Stucco
Three Layers Weatherproofed Sound Deadening Asphalt Mastic
Bishopric Sheathing
No. 2 Dead Air Space
Three Layers Waterproofed Fibreboard
Bishopric Interlocking Dovetailed Key Creosoted Strips for Stucco
Stucco
Bishopric Sheathing
Floor
Joist
Studding
Ceiling
Plaster
Bishopric Interlocking Dovetailed Key Strips

Residence of W. H. Brooks, Secretary, Standard Fuel & Material Company, Birmingham, Ala. Architect, Harry B. Wheelock, Birmingham, Ala. Bishopric Stucco Base used on all exteriors. Bishopric Plaster Base used on all interiors.

STANDARD FUEL & MATERIAL CO.

Birmingham, Ala. 5-25-21.

THE BISHOPRIC MFG. CO.
Cincinnati, Ohio.
Attention C. H. Dreyfus, Sec'y.

Gentlemen: I am sending under separate cover a picture of my home, thereby showing that the people who sell Bishopric products not only talk "Bishopric" but use it as well.

I used Bishopric Base inside and outside in the construction of my own home, and I want to say that I can consistently recommend Bishopric, and I know this will greatly help your sales in this neck of the country.

Yours very truly,
W. H. BROOKS, Sec'y.

WHB:S.

THE life of a Bishopric-Built home cannot be reckoned by years—it is a matter of generations.

Once built, that home becomes a lasting thing of beauty and satisfaction and economy.

Economy, because here is no cost of upkeep.

A frame home, for proper care must be painted every few years.

A Bishopric-Built Stucco home does not entail this added expense.

There is no paint to fade, and it keeps its attractive whiteness.

Then, too, the Bishopric-Built home is economical for it can be constructed with less expense than a brick or frame home.

The home built of Bishopric means real economy and durability.

You build but once; build right.

THE DOVETAILED KEY INTERLOCKS THE PLASTER
BISHOPRIC STUCCO AND PLASTER BASE
TRADE MARK REGISTERED

We have prepared "Bishopric for All Time and Clime," a booklet for you, containing facts and figures, and illustrated with photographs of beautiful houses built with Bishopric stucco, plaster and sheathing units. Ask for it.

THE BISHOPRIC MANUFACTURING COMPANY

17 ESTE AVENUE **CINCINNATI, O.**

NEW YORK CITY OFFICE, 2848 GRAND CENTRAL TERMINAL FACTORIES: CINCINNATI, OHIO, AND OTTAWA, CANADA

BUILDING AGE

Founded 1879

DECEMBER, 1921 Vol. XLIII, No. 12

Contents

Pomander Walk 19

Some California Bungalow Courts.... 22

The Economy and Advantages of Group Development 24

A Well Planned Colonial Home...... 28

Hollow Tile School 30

From Carpenter to School Builder.... 31

Twelve Family Dwelling with Unusual Exterior 34

Built-in Features for Modern Homes.. 36

How to Frame a Curved Rafter Roof. 38

Hollow Tile House of English Design. 40

Modern Bank Design................... 42

Financing the Small Building......... 43

A Town Hall and Fire House.......... 44

The Treatment of Pine Knots and Sappy Parts 46

Modern Dairy Barn 47

Correspondence Department—

How to Make a Dressing Table.... 48

Covering Steam Pipes............... 48

An Attractive Sign Board.......... 48

Worm Fences 48

Placing Grounds for Plastering..... 49

Using Dynamite for Breaking Up Concrete 49

How to Find the Strength of Ropes. 49

A Floor Scraping Kink............. 49

Community Garages 50

For Better Small Church Architecture.51

Attractive Garden Gates 52

What the Editor Thinks............. 53

"Before" and "After" 54

How to Save Time in Preparing Estimates 55

Review of Building Situation......... 56

Trend of Material Prices............. 58

Legal Department

The Architect or Builder as an Expert Witness 60

Right of Builder to Abandon Work Because of Delayed Installments.. 62

Departures from Building Contract Hold Back Payments 62

New Catalogs and Publications........ 64

Published Monthly by
BUILDING AGE PUBLISHING CORPORATION
912-920 Broadway, New York City

Entered as second-class matter December 20, 1909, at the Post Office at New York, N. Y., under act of March 3, 1879.

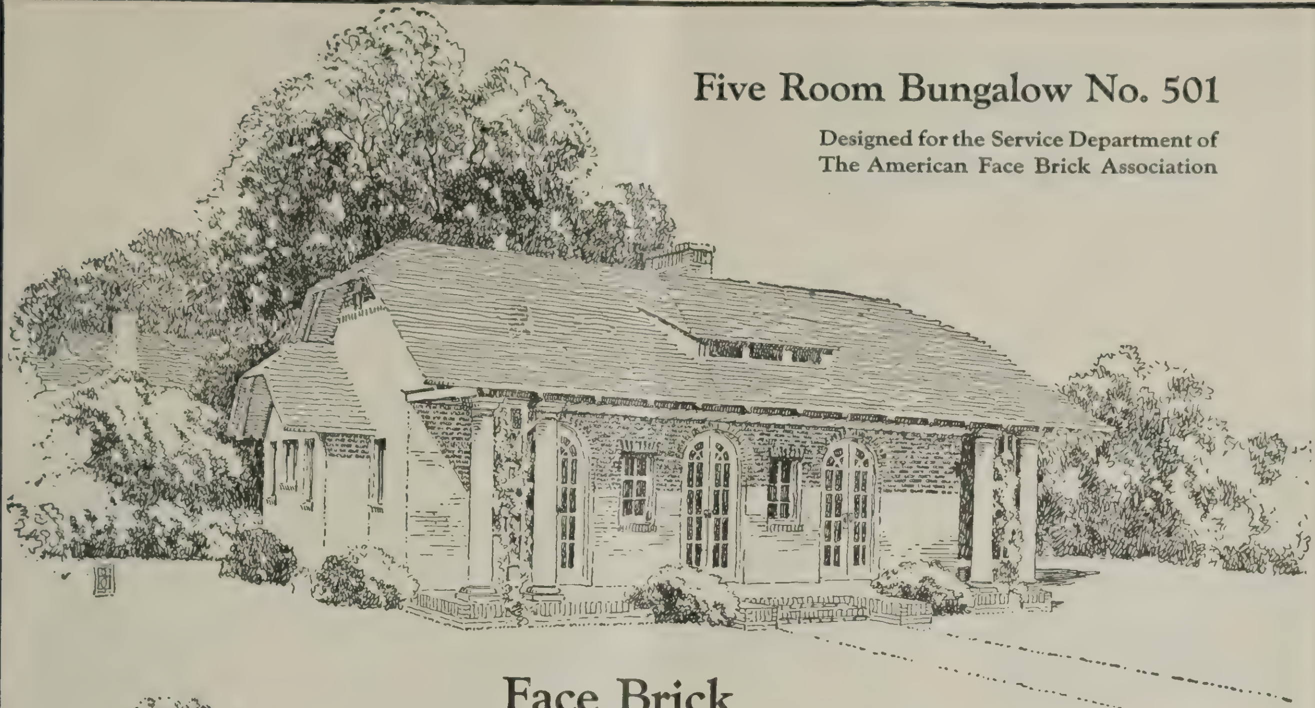
Copyrighted, 1921, by Building Age Publishing Corporation

Subscription price, $2.00 in the United States and Mexico; $2.50 in the Dominion of Canada; all other countries, $3.00. Single Copies, 25 cents. Foreign subscriptions payable in New York funds.

BRANCH OFFICES: William C. Shaughnessy, Western Manager, First National Bank Building, Chicago, Ill.; W. A. Douglas, Pacific Coast Manager, 320 Market St., San Francisco, Cal.

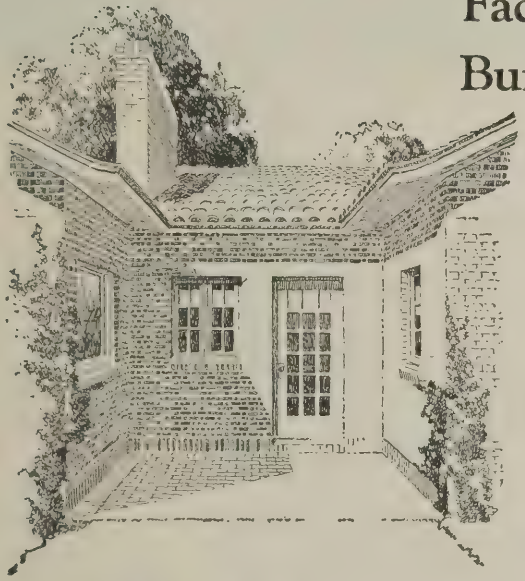
Frank Meyers President
Wm. C. Shaughnessy, Vice-President
Charles G. Peker, Editor

Wm. H. Parsons, Secretary
David Meyers, Treasurer
Geo. C. Williams, Advertising Manager

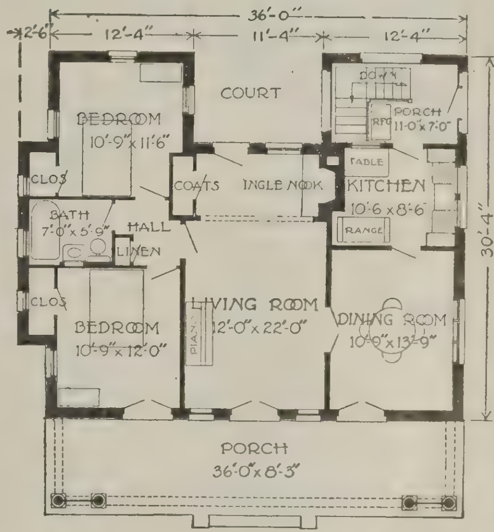


Five Room Bungalow No. 501

Designed for the Service Department of
The American Face Brick Association



Face Brick
Bungalows
and
Small
House
Plans



A·F·B·A
USE FACE BRICK
—it Pays

PLANS—Your Stock in Trade

A CONTRACTOR or builder without a comprehensive selection of house plans is like a merchant with a depleted stock of goods before Christmas. *What* you can build is as important to the prospective home owner as *how well* you can build.

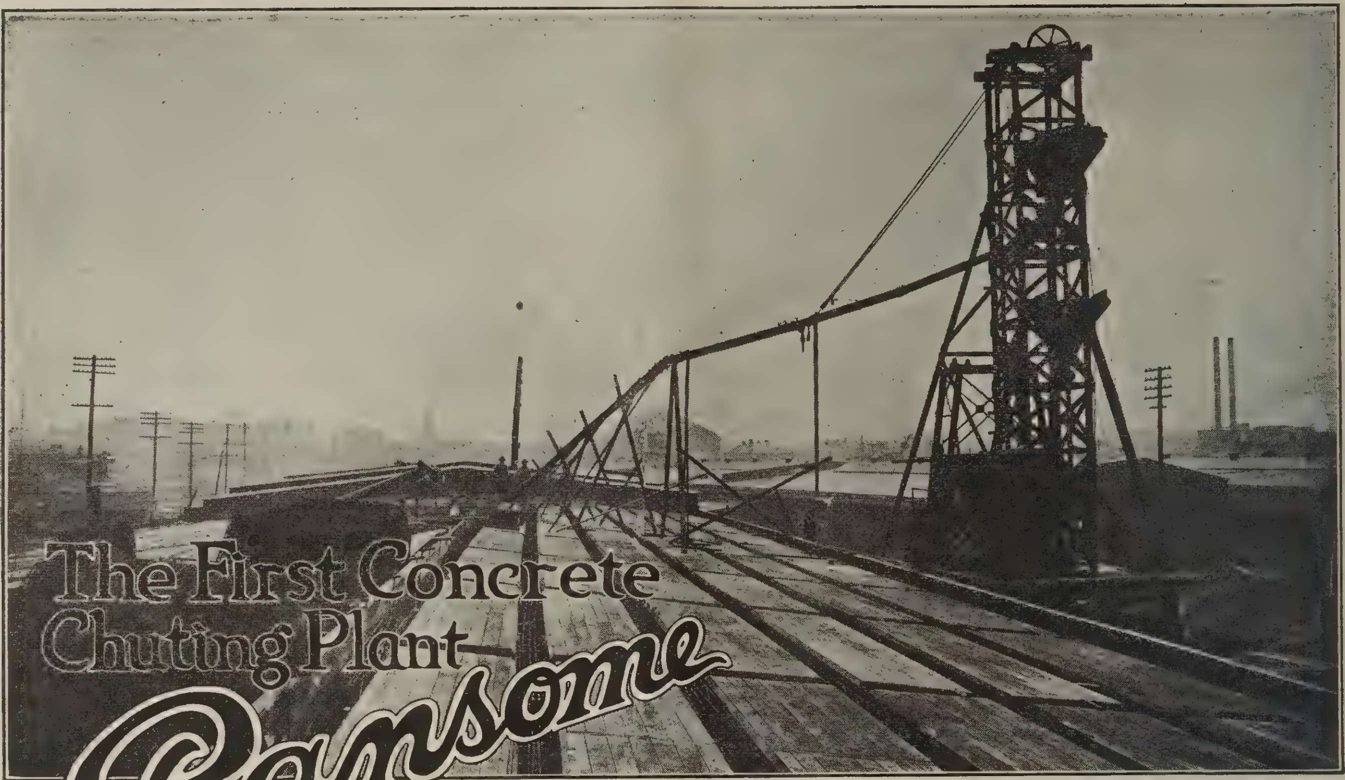
We solve this problem for you in our booklets of "Face Brick Bungalow and Small House Plans," which contain 92 beautiful small homes created by the best architectural skill. You can secure on short notice complete working blue prints and masonry bills of material for any of the designs pictured in these booklets.

As a builder, you need these books. They will prove as useful as your telephone. You can secure them at less than their cost delivered to you. Single booklets, devoted to houses of a definite size, are 25c; the entire set of four is $1.

You should also have our other books: "The Story of Brick," which will be sent free; "The Home of Beauty," a book of home designs submitted in architectural competition, price 50¢; and the "Manual of Face Brick Construction," an authentic text book for the builder or layman, supplemented with thirty house designs in full colors, price $1.00. If you do not have these books, write for them now. Address Dept. B. A. 12.

THE AMERICAN FACE BRICK ASSOCIATION

110 South Dearborn Street, Chicago



The First Concrete Chuting Plant

Ransome

Built in 1909

Here's a photo of the first chuting plant designed and built by a Ransome Engineer, and used in the construction of the Illinois Central Railroad Terminal Warehouses Nos. 1, 2, 3, and 9, at New Orleans in 1909, Mr. O. M. Gwinn, Superintendent of Construction.

The size of the buildings—each is 554 feet long—presented a problem in economical handling of the concrete until a Ransome Engineer supplied the answer:

A chuting plant—Ransome, of course!

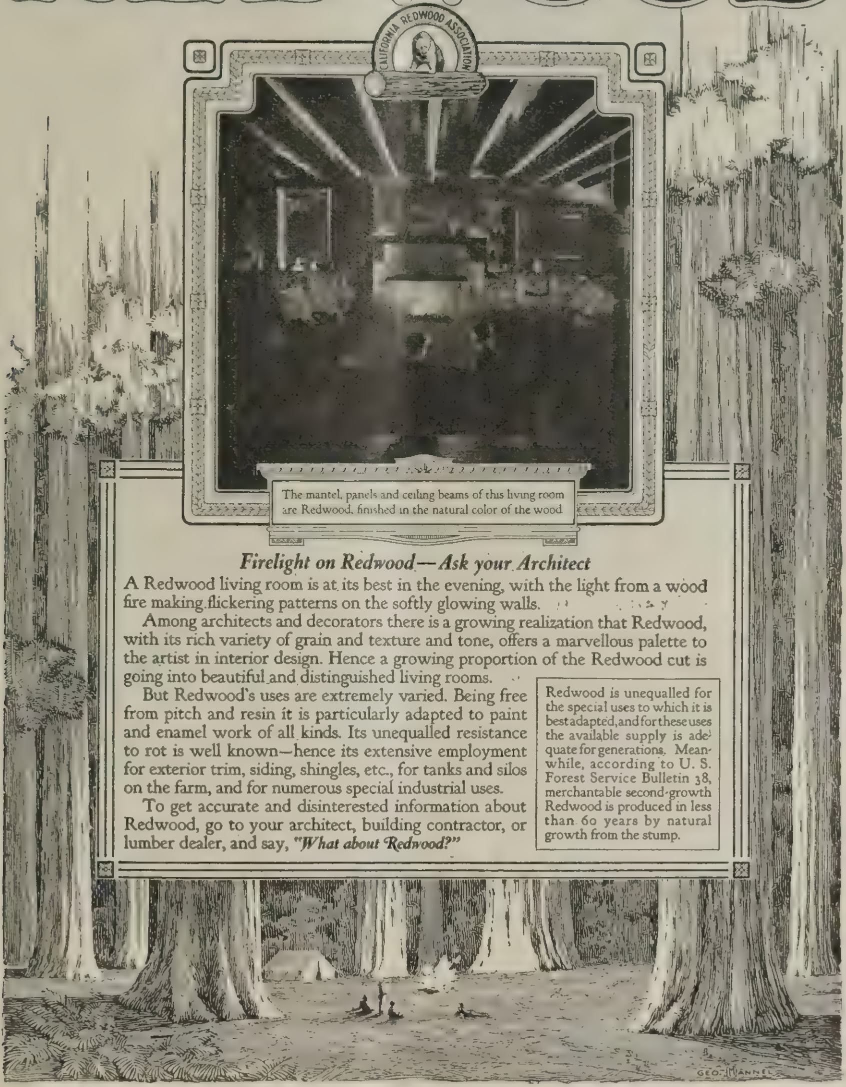
Ransome experience—covering more than 70 years—and the completeness of the Ransome line, are two things that have repeatedly saved contractors time and trouble. The quality of Ransome Concrete Machinery invariably saves its users money.

Write for Bulletin No. 201 on Ransome Chuting Plants

RANSOME CONCRETE MACHINERY CO.
Manufacturers of Mixers, Pavers, Pneumatic Mixers, Chuting Plants, Hoist Buckets, Bins, Cars, Carts, etc.
1774 Second Street, Dunellen, N. J.

31-210

CALIFORNIA REDWOOD



The mantel, panels and ceiling beams of this living room are Redwood, finished in the natural color of the wood

Firelight on Redwood—Ask your Architect

A Redwood living room is at its best in the evening, with the light from a wood fire making flickering patterns on the softly glowing walls.

Among architects and decorators there is a growing realization that Redwood, with its rich variety of grain and texture and tone, offers a marvellous palette to the artist in interior design. Hence a growing proportion of the Redwood cut is going into beautiful and distinguished living rooms.

But Redwood's uses are extremely varied. Being free from pitch and resin it is particularly adapted to paint and enamel work of all kinds. Its unequalled resistance to rot is well known—hence its extensive employment for exterior trim, siding, shingles, etc., for tanks and silos on the farm, and for numerous special industrial uses.

To get accurate and disinterested information about Redwood, go to your architect, building contractor, or lumber dealer, and say, *"What about Redwood?"*

Redwood is unequalled for the special uses to which it is best adapted, and for these uses the available supply is adequate for generations. Meanwhile, according to U. S. Forest Service Bulletin 38, merchantable second-growth Redwood is produced in less than 60 years by natural growth from the stump.

This advertisement is appearing in the December issue of Atlantic Monthly, Century, Harpers, Scribners, The Review of Reviews, World's Work

THIS advertisement is written with just one purpose in mind: to send prospective home-builders to their logical technical advisers—the architect, the building contractor and the lumber dealer—with a question: "What About Redwood?" You can answer this question, and it is your opportunity to secure a client or a customer. Complete information, prices and specifications may be obtained by addressing any of the sales and distributing branches listed below.

SALES AND DISTRIBUTING BRANCHES

Redwood Sales Company (representing six producing companies*) Exposition Bldg., San Francisco, California.

John D. Mershon Lumber Company, (agent), 803 Flatiron Bldg., New York City.

A. C. Dutton Lumber Corporation, (agent), Springfield, Mass.

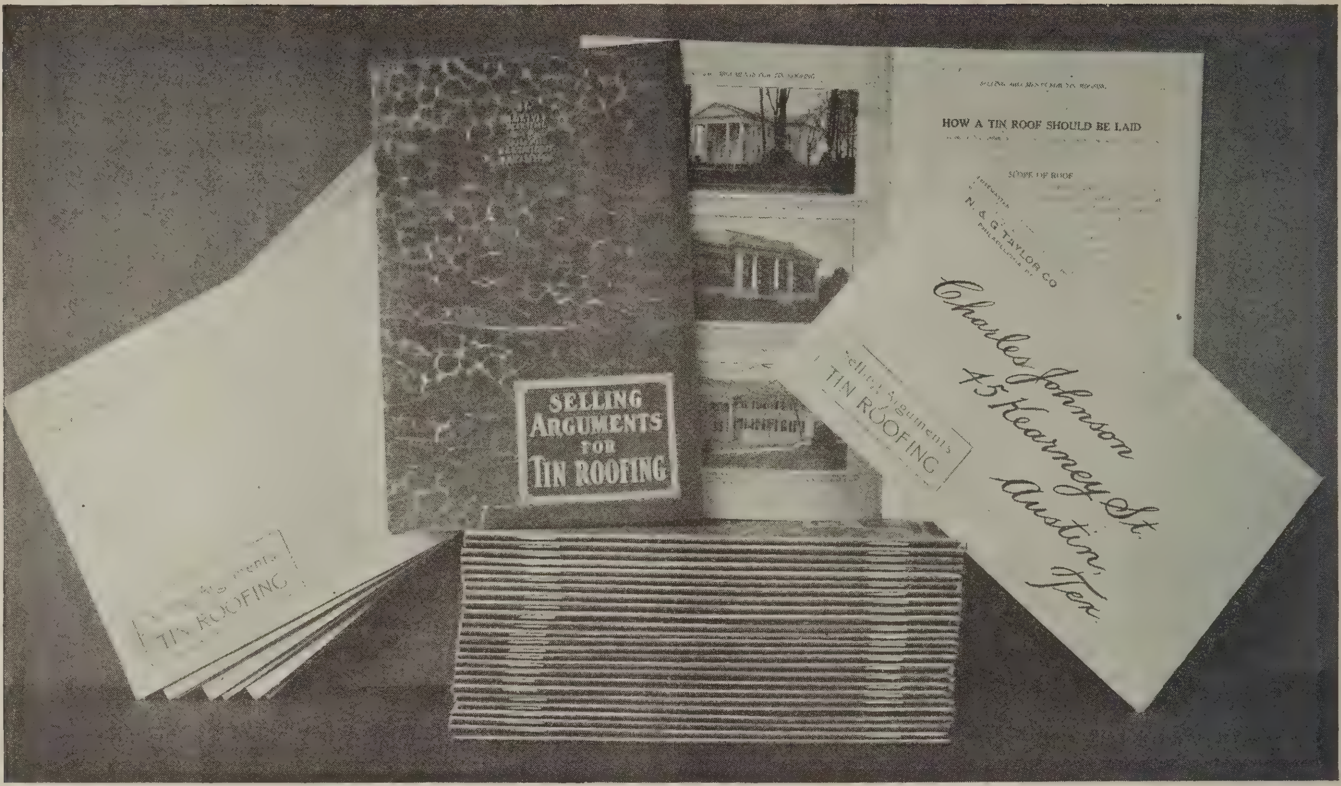
The Pacific Lumber Company, 311 California Street, San Francisco, and Central Bldg., Los Angeles, California.

The Pacific Lumber Co., of Illinois, 522 Fifth Avenue, New York City; McCormick Bldg., 322 So. Michigan Ave., Chicago, Ill.; Grand Ave., Temple Bldg., Kansas City, Mo.

Union Lumber Company, (representing two additional producing companies†), Crocker Bldg., San Francisco; Merchants National Bank Bldg., Los Angeles, California; 2850 Grand Central Terminal Bldg., New York City; McCormick Bldg., Chicago, Ill.

MEMBER COMPANIES (*San Francisco Offices*)

*Albion Lumber Company
*Dolbeer & Carson Lumber Company
†Glen Blair Redwood Company
*Hobbs, Wall & Company
*Holmes, Eureka Lumber Company
*Little River Redwood Company
†Mendocino Lumber Company
Union Lumber Company
*Northwestern Redwood Company
The Pacific Lumber Company


SELLING ARGUMENTS FOR TIN ROOFING
HOW A TIN ROOF SHOULD BE LAID
N. & G. TAYLOR CO
Selling Arguments TIN ROOFING
Charles Johnson
45 Kearney St.
Austin, Tex.
TIN ROOFING

THIS EIGHTY PAGE BOOK—FREE

Packed Full of Interesting Illustrations and Information

It contains over sixty pictures of Dwellings, Hotels, Churches, Libraries, Schools, Clubs, Garages, Office Buildings, Railway Stations, Ferry Houses, Docks, Piers, Court Houses, Prisons, Armories and other Public and Private Buildings successfully roofed with Tin.

Other illustrations and text tell how Tin Roofing should be laid, accompanied by tables for estimating and other useful information.

The carefully prepared illustrations and text, dealing with the value of Tin Roofing as a protection against the spread of fire, are exceptionally interesting and convincing to the man who is about to build. Your client should have a duplicate of your copy, which we shall be glad to send him on request.

This book coupled with our book "Roof Designs" and a series of four "SERVICE SHEETS," which give complete Tin Roofing details and specifications, form the most *complete* and *useful* collection of information on the subject of Tin Roofing ever published. We will send *you a copy free on request while the Edition lasts.*

THIS COUPON FOR YOUR CONVENIENCE

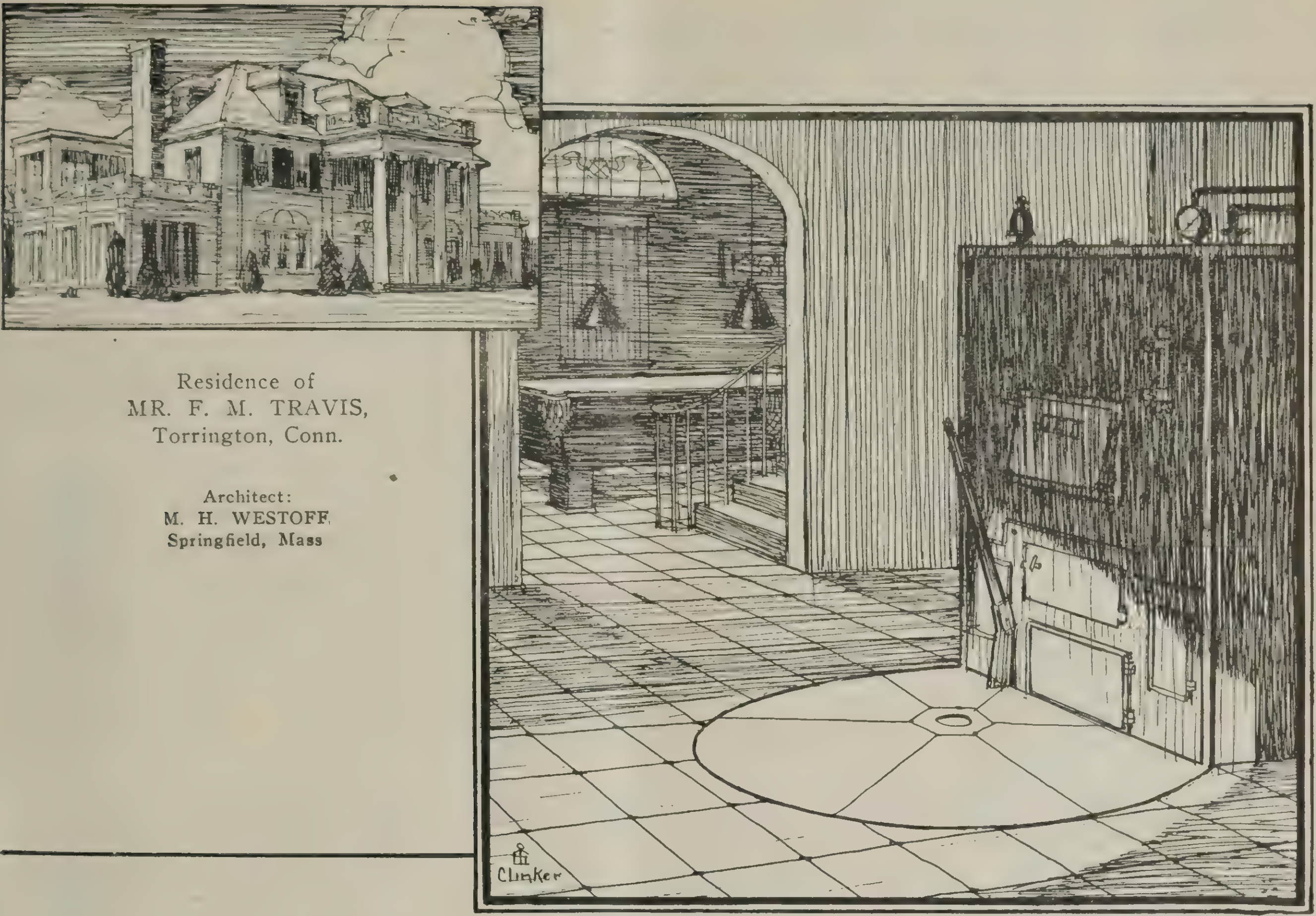
N. & G. Taylor Co., 300 Chestnut St., Philadelphia, Pa.

Gentlemen: Without any obligation on my part please send me your "Selling Arguments for Tin Roofing," "Roof Designs" and "SERVICE SHEETS" 1, 2, 3, 4 No. 18. Enclosed is 14 cents in stamps for packing and shipping.

....

....

N. & G. TAYLOR COMPANY
PHILADELPHIA, PA.
Makers of Target-and-Arrow Roofing Tin
ESTABLISHED 1810



Residence of
MR. F. M. TRAVIS,
Torrington, Conn.

Architect:
M. H. WESTOFF
Springfield, Mass

Problem of Ash Disposal Solved This Residence—

A way to keep furnace ashes, and ash cans, out of sight in the cellar is no longer a problem for Mr. F. M. Travis, who has a Sharp Rotary Ash Receiver. That daily unpleasant task of shovelling dusty ashes into cans is eliminated.

The Sharp Rotary Ash Receiver

installed in connection with any style heater keeps ashes out of sight. The work of shovelling ashes is reduced to a quick, easy matter of simply raking ashes through a hole in the pit below the grate into the can beneath.

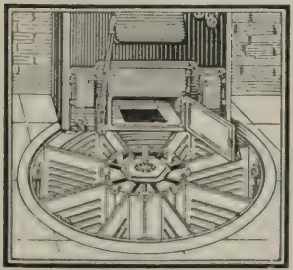
The Receiver is placed in a cement pit under the cellar floor and easily revolves on a pivot. The Receiver is equipped with five, eight or twelve cans, as you desire. Easily installed in new or old homes.

Builders, Building Supply Dealers and Agents are invited to take up with us the matter of selling the rights in their territory.

Send for descriptive catalog.

SHARP ROTARY ASH RECEIVER CO.
207 Bridge St., Springfield, Mass.

The cellar as clean as



the rest of the house.

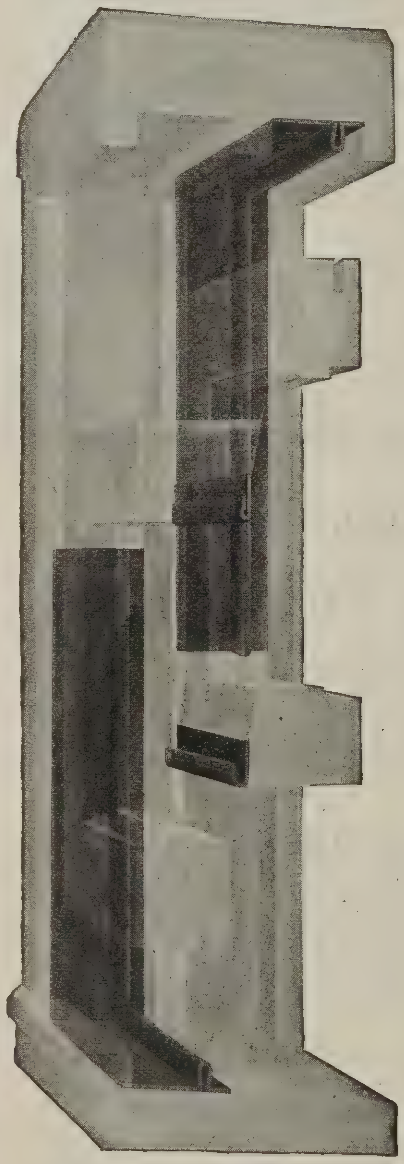
In the Days of Our Grandfathers

Rags and Old Papers were stuffed in the Cracks around Windows and Doors to keep out Cold, Wind, Storm and Dirt.

OUR FATHERS

Used Strips of Wood and Rubber or Felt which Wore Out, were Unsightly in Appearance and Inefficient

LOOKS LIKE OTHERS BUT ENTIRELY DIFFERENT



X-Ray View of Window Showing How it Appears Installed

We of Today

Demand that which is scientific in principle, practical in application, efficient in service and lasting in quality.

That's the "Why" of

Diamond Metal Weather Strips and Diamond Calking Compound

They Meet Every Requirement
Time Tested and Tried

Our Trade-Mark is Your Protection Against Imitations

PRACTICAL METAL WEATHER STRIPPING — THE DIAMOND WAY

(Registered)

See that your specifications read and your contractor installs "DIAMOND" Weather Strips and Calking Compound in the Windows and Doors of your New or Old Building.

CONTRACTORS, CARPENTERS and Building Specialty Men will find a "DIAMOND" Agency Most Profitable

Some Very Desirable Territory Still Open

Send for Our Agency Proposition NOW — TODAY — Address

THE DIFFERENCE

The runway or side strip is made in two sections, a base with a foldover under which the rib interlocks and is held in place by a screw and mitre at sill or top.

To remove sash take out screw.

Only one side need be removed.

To replace sash just reverse operation.

After rib is removed if it is necessary to get into weight pocket it can be done without kinking or damage.

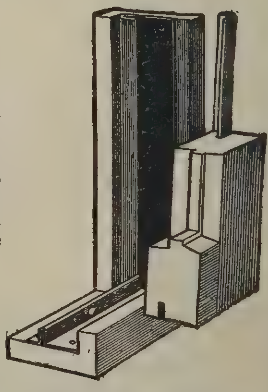
Our Equipments A, B, C, have this removable and flexible feature which is fully appreciated by carpenters and repair men.

Sash warp, swell and shrink and cause trouble by binding.

Parting stops or the dividing strip being exposed to the weather swell and bind the sash making it difficult to raise.

All this is avoided if *Diamond Flexible* strip is used as they are so made that they allow for these defects and adjust themselves to meet and overcome these objections.

That's why windows equipped with *Diamond Flexible* strips always slide easy.



Section Showing Removal of Sash and "Flexible" Strip at the same time.

The Diamond Metal Weather Strip Company

626 KERR STREET, COLUMBUS, OHIO
WESTERN FACTORY BRANCH — FORT DODGE, IOWA

FLEX-A-TILE

HOUSE TOPS

For any Roof any where

Sell quality and service as well as roofing—that is the Flex-a-Tile proposition. When you offer your customers Flex-a-Tile Housetops, you are putting your roofing business on a quality basis, but at moderate prices.

Back of the Flex-a-Tile distributor and dealer is the enormous Richardson Company, who make this product "from the ground up." This organization controls its own slate quarries, felt mills, roofing mills and asphalt plants.

The watchword of every workman is "Keep up the quality—it must not vary—*Flex-a-Tile must be right.*"

Distributors have in Flex-a-Tile a complete line for any and every asphalt roofing requirement. They realize that dealing entirely with one organization able to supply the very best of everything for any kind of an asphalt roof, is the most desirable arrangement and the surest way of getting service, co-operation and maximum profit.

Flex-a-Tile distributors find that their dealers have great faith in the Flex-a-Tile line. This faith is well reflected in a big volume of profitable sales and the fact that Flex-a-Tile dealers keep on selling this complete line year after year.

Flex-a-Tile "Built-On" Asphalt Roof

for Board or Concrete Decks, Steep or Flat

Architects, industrial engineers and roofers who have come up through the school of experience, know the value of asphalt roofing.

Flex-a-Tile "Built-On" asphalt roofs meet every demand of the architect, industrial engineer or roofer, who is building for long and satisfactory service.

Flex-a-Tile "Built-On" roofs have proved their ability to withstand the severe heat of summer without running or cracking, year after year. Such extraordinary lasting and water-proof qualities have never been obtainable excepting in asphalt roofs.

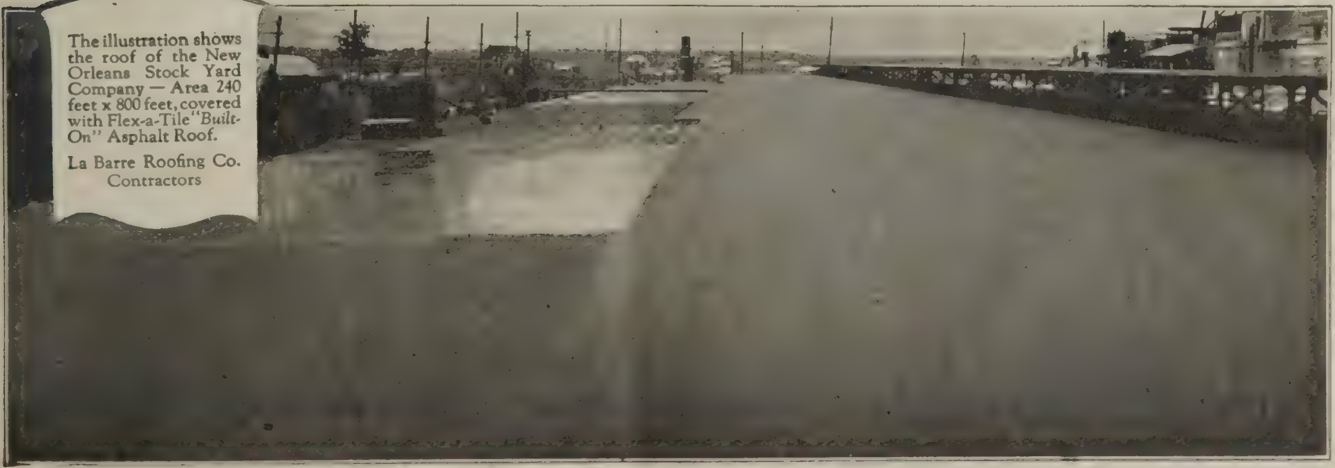
The "Built-On" asphalt roofing business is gaining new business every day. It will pay you to know the facts about Flex-a-Tile "Built-On" asphalt roofing. *Our portfolio of specifications gives this information in full. Send for it today.*

The RICHARDSON COMPANY

A Well Known Name for 50 Years in the Roofing Industry

Lockland (Cincinnati) Ohio SALES OFFICES **Melrose Park (Chicago) Ill.**

516 Fifth Ave., New York City **Candler Bldg. Atlanta, Ga.** **Plymouth Bldg. Minneapolis, Minn.** **Lockland, Ohio (Cincinnati)** **Canal-Commercial Bldg. New Orleans, La.** **Melrose Park (Chicago) Ill.**



The illustration shows the roof of the New Orleans Stock Yard Company — Area 240 feet x 800 feet, covered with Flex-a-Tile "Built-On" Asphalt Roof.

La Barre Roofing Co.
Contractors

Dealers! Turn your customers into *salesmen!*

Fireproof—

No paint—

No repairs—

Last forever

THE man whose roof is covered with Ambler Asbestos Shingles is a salesman for the dealer who sold them. If you are not already handling these shingles get in line and see your roofing jobs increase!

FIREPROOF
AMBLER ASBESTOS SHINGLES

Ambler Asbestos Shingles. Made in three styles, four permanent colors, Newport grey, natural slate, red and green. Lie snug to the roof, forming water-tight and fire-tight covering.

Ambler Asbestos Building Lumber. For siding, partitions, fire doors and wherever fire resistance is essential.

Ambler Asbestos Corrugated Roofing and Siding. For industrial, railroad and farm buildings.

Ambler Linabestos Wallboard. Wherever a superior flameproof, fire-resisting wallboard is wanted.

Send for Samples and Literature showing reproductions of installations.

ASBESTOS
SHINGLE, SLATE & SHEATHING CO.
AMBLER, PENNA.

BRANCH OFFICES:—Atlanta—Boston—Buffalo—Chicago Cincinnati—Cleveland—Minneapolis—New York Philadelphia—Pittsburgh—Washington.

Distributers throughout the Country.

Tear Coupon Here

ASBESTOS SHINGLE, SLATE & SHEATHING CO.,
Ambler, Penna. Dept. C.

Dear Sirs:—

Kindly reserve my territory for me as sole distributor of Ambler Asbestos Shingles and Building Products and send your man along with your proposition. This in no way obligates me.

Signed ....

Address ....

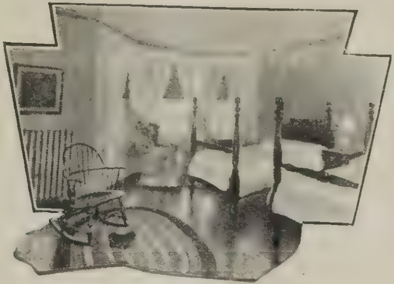
State ....

OAK FLOORS

(For Everlasting Economy)

OAK
F M A
U S A

Stands for Quality, Uniformity and Responsibility. Stamped on every stick.



SEE OUR CATALOGUE IN SWEET'S

For general specifications, see page 458, Sweet's Architectural Catalogue, 16th Edition.

You Can Make Money Selling Oak Flooring

Turn Your Practical Knowledge Into Cash

No matter whether you are a builder, contractor or carpenter, here is an opportunity for you to add to your income. When work is slack, as in winter, you can always line up buyers for Oak Flooring.

Oak Flooring is really easy to sell—when you know how. The thing to keep in mind is the price. Every one knows that it is the most beautiful, durable, sanitary and easy-to-clean flooring. But people outside the building trades and professions think it is very expensive.

Correct the Price Mistake

Prospects do not know, for instance, that Oak Flooring costs less than ordinary flooring, plus carpets. Or that it adds 25 per cent. or more to renting and selling values. In quoting prices give them by rooms, not by the thousand. That makes the price look bigger to the prospect than it is.

New Oak Floors Over Old

A special 3/8-inch thickness is milled for laying over old, worn floors. This is a job that can be done in any weather. You know where building is going to start. Where repairs are needed. See your friends among Oak Flooring dealers and then see the people you know are in the market for flooring.

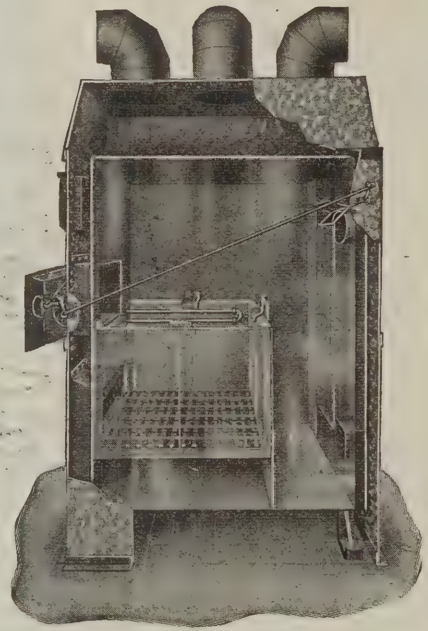
Write for our 3 free booklets, in colors. They contain all the information necessary to make you a competent Oak Flooring salesman. Write today.

OAK FLOORING MFRS. ASSN.
1041 Ashland Block, Chicago, Ill.

Absolutely Dependable

A HESS WELDED STEEL FURNACE

in your home will circulate warmth and correct humidity to every nook and corner. Positively effective in coldest weather.



If your heating is installed according to our free plan, we accept all responsibility and guarantee success in every particular.

Distance is no obstacle—our heating equipments in Alaska, Florida, New England are just as efficient and economical as the twelve thousand heaters we have installed in Chicago.

Send us a sketch of your house. We will tell you what type of furnace is best —"pipe," "pipeless," or "one-pipe." We will plan the heating for you and tell you the cost, laid down at your door. No charge. No obligation. The benefit of our forty-eight years' experience and our free literature on heating are yours for the asking.

HESS FURNACES NEVER LEAK.
THEY BURN ANYTHING. DELIVER ALL THE HEAT.

CONTRACTORS all over the land avail themselves of our free plan service and have added the installing of Hess Furnaces to their activities. A good house, well heated, is the best advertisement for a contractor.

We make special rates for resale

HESS WARMING & VENTILATING CO.
1201-M TACOMA BUILDING, CHICAGO

"The Roof that's Always New"

Not only is the Illinois Zinc Shingle everlasting—not only is it artistic—but it's the most convenient and practical form of shingle ever devised. Every roofer should at least investigate this revolutionary roofing.

ILLINOIS

ZINC SHINGLES

"IF any of the architects I know had specified zinc shingles for the roofs I build, I would have thought that he'd lost his mind. But if what you say is so about the Illinois Zinc Shingles, they'll *all* be specifying zinc on every shingled roof I build."

Yes, sir—they *will,* for every *word* of it is so. These shingles make a *butt-shingled* roof in every way as artistic as a roof of slate or wooden shingles.

They are not like any metal roof or metal shingle you have ever seen before. They're made—not plated—from pure zinc. It's indestructible—can't crack, rust, rot, warp, work loose or burn—and will long outlast the building it protects.

Other builders have judged it the very best roofing material and the very best form of shingle ever placed on the market. But we want you to judge it *for yourself.*

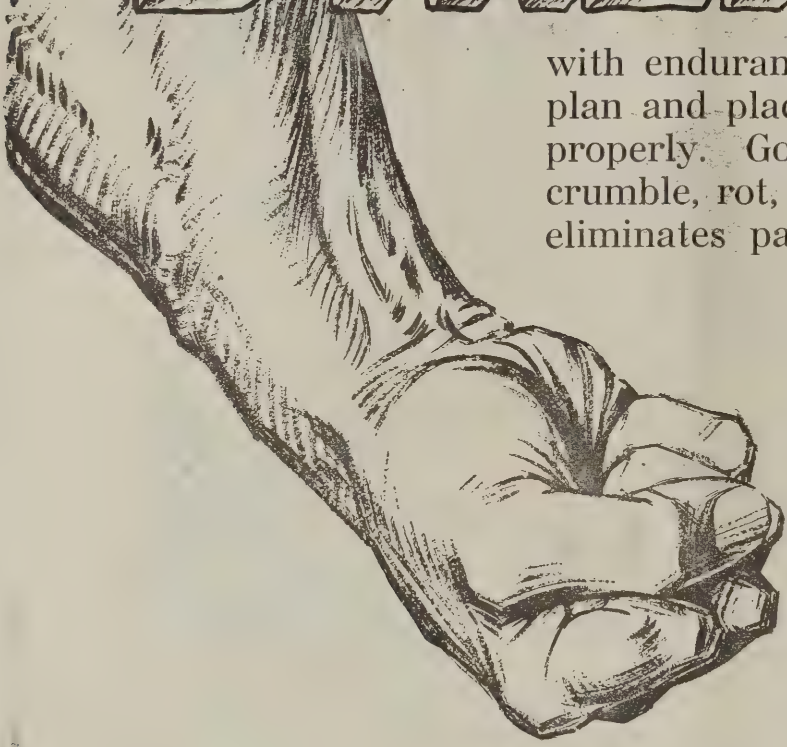
Please send, therefore, for samples and descriptive booklet. We will leave the rest to you.

ILLINOIS ZINC COMPANY
280 BROADWAY, NEW YORK
SMELTERS & ROLLING MILLS, PERU, ILL.
Established 1870

CORRUGATED ZINC SHEETS FOR ROOFING AND SIDING
ILLINOIS ZINC SHINGLES—STRIP OR RIBBON ZINC
SLAB ZINC (SPELTER)—WIDE ZINC SHEETS

Producers of Electrolytic Slab Zinc guaranteed 99.99% pure zinc. The highest grade of Slab Zinc produced in the world.

STRENGTH



with endurance is what you get when you plan and place your cement improvements properly. Good cement construction won't crumble, rot, rust or wear out for ages. It eliminates painting and replacing. Looks clean and substantial and adds value to your property.

Just be sure to do your cement work right while you are at it. Follow the simple directions in the ALPHA CEMENT Handbook, 96 pages illustrated, telling what you ought to know about form-building, mixing, reinforcing, placing and curing, and giving details of scores of improvements, such as tanks, driveways, storage buildings, garages, workingmen's homes, etc.

It's as good a book as you could buy for a dollar or two.

Your local ALPHA CEMENT dealer has been authorized by us to give you a copy of this valuable book with our compliments. Be sure to get your copy. If your dealer's supply is exhausted, he can get a copy for you by writing to us.

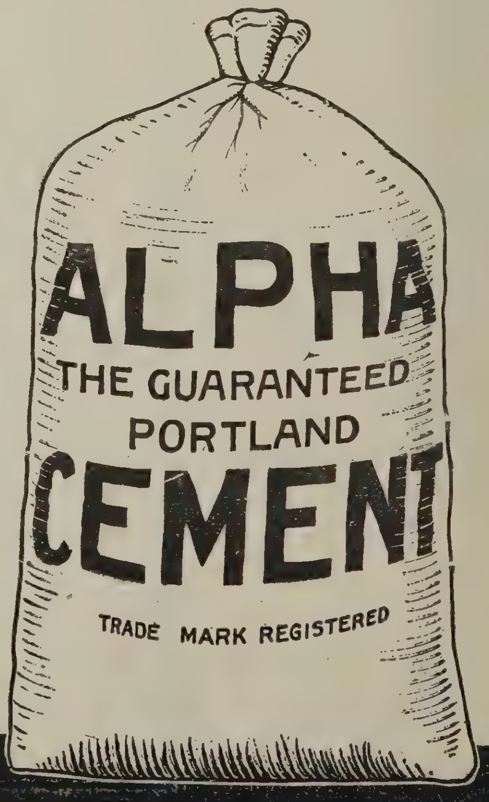
Mention Building Age

ALPHA PORTLAND CEMENT COMPANY

Easton, Pa. 140 S. Dearborn St., Chicago, Ill.

New York Philadelphia Boston Pittsburgh
Baltimore Bellevue, Mich. Ironton, Ohio

Plants at: Alpha, N. J.; Cementon, N. Y.; Manheim, W. Va.; Jamesville, N. Y.
Martins Creek, Pa.; Ironton, Ohio; La Salle, Ill.; Bellevue, Mich.



Use Alpha Cement

This is a Winter Job for Some Carpenter-Contractor

Don't let your business die away during the winter months because new building declines. You can maintain a profitable volume by devoting your energies to remodeling store interiors.

Remodeling with Beaver Board is always profitable. But after the Christmas rush is over, retail stores regularly do their remodeling and interior alterations for the ensuing year. This is a real source of winter business—and Beaver Board is the logical material for many reasons.

It can be applied without muss or litter—*without hindering business.* It produces exceptionally artistic interiors and ceilings which are permanent because overhead traffic and jars do not effect it. It never develops cracks or flaws.

We have a special department which will prepare without charge specification designs and color combinations on jobs you are either figuring on or actually have.

Write for the details of this helpful service which really is producing winter business for carpenter-contractors all over the country.

THE BEAVER BOARD COMPANIES
Administration Offices, Buffalo, N. Y.; Thorold, Ontario, Canada; London, Eng.
District Sales Offices at New York, Philadelphia, Atlanta, Buffalo, Cleveland, Cincinnati, Detroit, Chicago, St. Louis, Kansas City and Dallas.

Sold by Lumber and Building Material Dealers Everywhere

BEAVER BOARD

You can't expect Beaver Board results unless this trademark is on the back of the board you buy.

BEAVER QUALITY

FOR BETTER WALLS & CEILINGS

When men get together

Every man at heart is a builder, a craftsman, a tool user whether he has found it out yet or not.

See how this new Stanley Tool Cabinet holds the stage! It has just been delivered to the office of a successful builder, for his own use, in odd jobs around the home.

Every man there admires the Stanley Cabinet — and wants one like it for himself. Note, too, that the builder's **client** appreciates the builder's interest in having the **finest** tools.

Write for descriptive folders, E-12, on the new line of Stanley Tools in Cabinets, Boxes and Sets.

THE STANLEY RULE & LEVEL PLANT.
THE STANLEY WORKS
NEW BRITAIN, CONN.
Manufacturers of Wrought Hardware and Carpenter's Tools.

WITH THEIR PATENTED TELFAX TAPE MARKER

"WILLIAMSPORT"

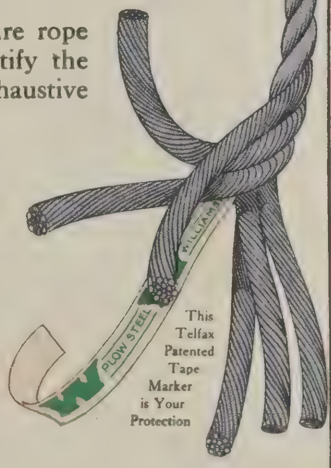
Reveals to you the Greatest Advancement of all times in the making of Wire Rope

—and settles forever today's greatest problem in the wire rope industry, by making it possible for anyone to identify the various grades of Williamsport wire rope without an exhaustive and expensive laboratory test.

Beginning November, 1921, every inch of Williamsport Wire Rope contains a distinguishing Telfax Patented Tape Marker, built right through the core of the hemp center, indicating clearly, by distinctive design and color, the various grades of wire rope.

No greater achievement has been accomplished since the beginning of wire rope manufacture. It takes from the industry, as far as Williamsport is concerned, all mystery, all uncertainty, all doubt.

It enables the purchaser to buy with the assurance that their receiving department can tell exactly what has been received, and the superintendent, directly responsible for the lives of his workmen and the efficiency of his equipment, can now see instantly, for himself, that he has received exactly what he has asked for.



This Telfax Patented Tape Marker is Your Protection

Thus Williamsport stands alone in giving to the dealer and user a protection of vital, far reaching importance. And it places upon us a greater responsibility to exercise even greater diligence in keeping the quality worthy of the name it bears.

Never again will you need to feel concerned about the grade of wire rope you get, if you specify and insist upon getting WILLIAMSPORT, Telfax Tape Marked, for substitution cannot take place with Williamsport Wire Rope so marked, no matter

—How many hands it passes through en route.
—How many times it changes reels.
—How careless the warehouseman may be.
—How tricky the seller may be.

If you want to be certain of getting the grade of wire rope you buy—specify "Williamsport". Send today for your Telfax color chart and other literature on this Modern Wire Rope.

WILLIAMSPORT WIRE ROPE COMPANY

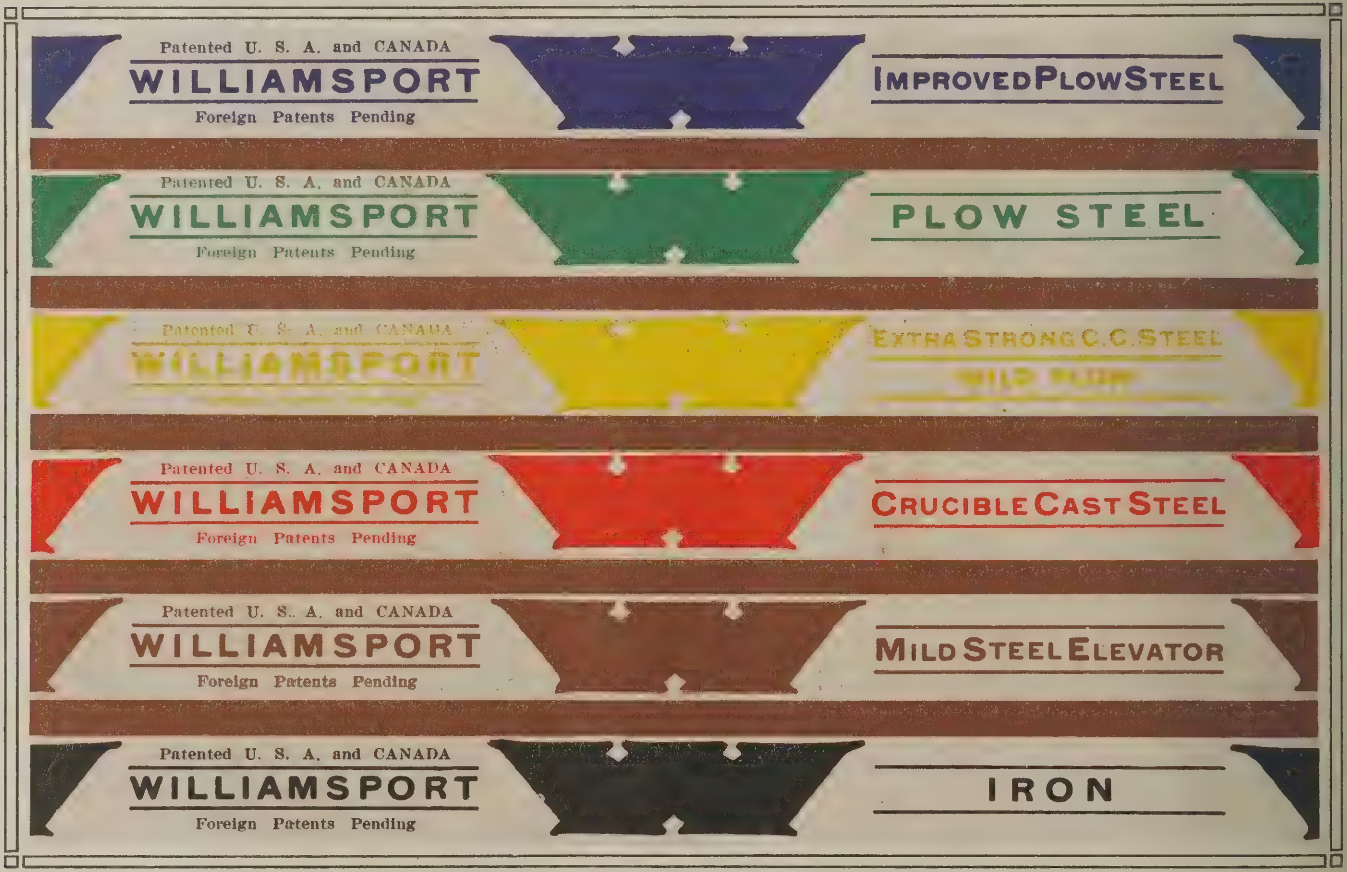
Main Office and Works
Williamsport, Pa. *"accepted as the best"*
General Sales Office: Peoples Gas Bldg
Chicago, Illinois.

TELFAX MARKERS ARE PATENTED IN THE

and Doubt has Lifted
MINE OPERATOR
CONTRACTOR
MANUFACTURER
JOBBER
E ROPE You Buy—if You SPECIFY
SPORT
that absolutely prevents Substitution

ANADA. FOREIGN PATENTS PENDING

You have been GUESSING on the grade of wire rope you have received ever since Wire Rope has been made. Now is the time to STOP IT. Specify WILLIAMSPORT with these Telfax Tape Markers in them — they will absolutely safeguard your purchase.



Write today for your Telfax Color chart and an interesting booklet on Modern Wire Rope

Williamsport Wire Rope Company

GENERAL SALES OFFICES
PEOPLES GAS BUILDING
CHICAGO

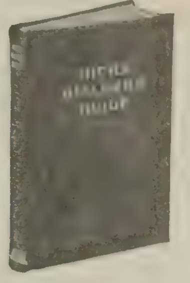
PLANT
WILLIAMSPORT
PENNSYLVANIA

WAREHOUSES IN ALL
CONVENIENT LOCATIONS IN
AMERICA

1,900 Pages, 4½x7 Inches. Over 1,000 Illustrations in Flexible Binding with Gold Edges, $7.00

Give a Trade Book It Will Be Helpful Every Day in the Year

Whether you buy it for yourself or someone else who is interested in building, everyone of the practical books listed below will prove unusually serviceable and acceptable. The Authors are leading authorities on their subjects and they have described the very latest methods. A majority of the books have been published within the last few months. You may have names stamped on front cover in gold at twenty-five cents a line.



360 Pages, 4½x7 Inches. 300 Figures, Numerous Tables. Attractively Bound in Dark Green Flexible Fabrikoid, $3.00

THE NEW KIDDER
Architects and Builders Pocket Book

Everyone in the Building field uses "Kidder's Pocket Book" and this new edition is just in time for Christmas. It is larger and better than ever. Prof. Nolan and the other authorities, who have worked with him in the revision and rewriting of the various chapters, have described the latest improvements in the methods and equipment.

They have quoted from many authentic sources as well as giving results obtained in their own daily practise. Every item has been carefully checked and rechecked to see that it is technically correct and the aim throughout has been to present clearly and concisely, and in the least possible space, all the information that is likely to be required by the architect, builder, structural engineer, draughtsman, or contractor, including data for estimating the approximate cost.

The New Kidder has 1900 pages of text, over 1,000 specially prepared diagrams and numerous tables. It is furnished in an attractive flexible binding with gold edges. Price $7.00.

Cosgrove's Hollow Tile Construction

A practical explanation of modern methods of designing and building fireproof residences of hollow tile, written so the builder may use it, with chapters on walls, floors, roofs, partitions, framework, estimating, photographs and floor plans of finished structure, etc. 256 pages, 4¾x7 inches, 145 figures, 70 plates, flexible fabrikoid, $2.50.

Dalzell's Homes of Moderate Size

A collection of photographs and plans of distinctive, but inexpensive suburban and country homes following the Colonial, Italian and English architectural styles, and arranged accordingly. Selected for their artistic merit and adaptability to the needs of the average American family. There are photographs and floor plans of 55 dwellings and one country club. They have all been built recently and architects and real estate operators who have bought it say it is the best collection of small and medium sized houses they have seen. 160 pages, 9x12 inches, 300 figures. Cloth, $4.00.

Distinctive Country Homes

A collection of 100 plates of distinctive homes with views of exteriors, doorways, gates and windows and floor plans. They range from the small house for a suburban plot to the more pretentious villa, with a good selection in all cases. 100 plates, 10x12 inches in double envelopes. Price $4.00.

Arthur's Estimating Building Costs

A book giving short cuts for estimating materials, output of labor and costs for all kinds of building work. The tables are especially reliable.

The book begins with the excavation, and ends when the house is finished. The chapters are: Excavations and Piling, Concrete, Brickwork, Stonework, Plastering, Metal, Roofing, Painting, Plumbing and Heating, Miscellaneous includes Hardware, Electric Wiring, Tiling, Bonds, Tables, Rafters, Cisterns, Weights, Comparisons of Cost Between Brick and Frame Buildings; Hints on Drawings. 228 pages, 4½x7 inches, 29 figs., 91 tables. Cloth, $1.50.

Weaver's "Country Life Book of Cottages"

A very interesting collection of small houses exclusively of the English architectural style; profusely illustrated with clean cut halftones of exteriors and interiors and dimensioned floor plans. They are constructed of concrete, brick, field stone, tile and thatch and special attention has been given to five, six and eight room cottages and gate lodges. Some of the five and six room dwellings are arranged in duplex form. 266 pages, 6x9 inches, 302 figures. Cloth, $4.00.

Wilson Bungalows

A short sketch of the evolution of the bungalow with photographic views; exterior and interior details and floor plans. 159 pages, 7x10 inches. Cloth, $1.00.

Crussell's Jobbing Work for the Carpenter

A book of time and labor saving methods, showing the shortest and most practical way of doing over one hundred special jobs. 277 special drawings are used to show each operation. The explanations are so clear that anyone who can use tools will have no difficulty in doing such things as constructing a work bench, building a saw horse, making and fitting doors, window frames and sashes, crating furniture and other household goods, cutting doorways through partitions, making counters, desks, bookcases, drawing boards, show cases, picture frames, regular, extension and rope ladders, fences, etc.

Special attention is given to labor-saving tools and equipment which the author has found so serviceable and which cannot fail to be appreciated by practical men. 273 pages, 6x9 inches, 270 figures. Cloth, $2.00.

Italian, Spanish and French Plates

An interesting collection of exteriors, interiors, gates, etc., of churches, palaces and other buildings. 30 plates, 9x12 inches, in manila envelope. $1.00.

Hick's New Builders' Guide

This standard book has just been revised and brought thoroughly up-to-date by the addition of much new material. It authoritatively covers masonry, hollow tile, estimating, roof framing, etc. Recommended by experienced men as the best modern text book for apprentices and journeymen. Full of practical "short cuts." A section of the book is devoted to tables which save considerable time that otherwise would be spent in lengthy figuring.

Contents by Chapters: Layout of Sit. Excavating, Sheet Piling and Pumping. Shoring and Underpinning. Stone Masonry. Water-proofing Foundation Walls. Concrete Construction and Forms for Concrete Footings and Foundation Walls. Brickwork. Hollow Tile, Construction and Costs. How to Do Stucco Work on Metal Lath. Brick and Wood Lath. How to Lay Out and Build Fireplaces. Chimney Design and Construction. House Framing. Roof Framing. Mitering Planceers, Mouldings, etc. Carpentry and Construction Kinks. Metal Ceilings and Walls. Estimating Quantities of Materials. Estimating Labor on Carpentry. Estimating Brickwork. Short Cuts in Estimating Forms, etc. Miscellaneous Tables. 360 pages, 4½x7 inches, 300 figures. Flexible fabrikoid, $3.00.

Arthur's Home Builders Guide

A treatise for those about to build, covering the selection of the site, the planning of the rooms and proper materials to use in construction.

Contents by Chapters: The "Lay" of the Land. The Planning of the Home. The Big Four. A Firm Foundation. The Framework. Covering and Adorning the Frame. The Bungalow. Brickwork. Cement Stone—and Mere Stone. Lath and Plaster. Sheet Metal Work. The Interior Finish. Plumbing and Gasfitting. Ventilation. Heating and Lighting. Painting. Finish Hardware. An Analysis of an Ideal Plan. Tornado Construction. Wind Bracing. 144 pages, 5x8 inches. Cloth, $1.00.

McCullough's Practical Structural Design

A complete system for the design of beams, floors, girders, trusses, columns, walls, foundations, footings, etc. The big feature of the book is that no knowledge of algebra or higher mathematics is necessary to understand the explanations, for all calculations, etc., are presented in the form of the ordinary arithmetic that every builder knows. The book contains the most approved practice of up-to-date offices and is profusely illustrated. 320 pages, 6x9 inches, 200 figures. Cloth, $3.00.

ANNOUNCEMENT

While this is a new organization, over twenty years' experience in publishing and selling mechanical books is at your service. The management and stockholders include men who are nationally known as authorities in the building and allied trades.

Sent Prepaid by

Arrow Book Company

347 Fifth Avenue, New York

SPECIAL OFFER

Any of these books may be returned within five days after delivery and your remittance will be refunded.

We will have names stamped on any of these books at cost, twenty-five cents a line. Books so stamped may not be returned.

Kawneer
SOLID COPPER
STORE FRONTS

Resilient or Vise Like Grip on Plate Glass? Which will give your customers best service?

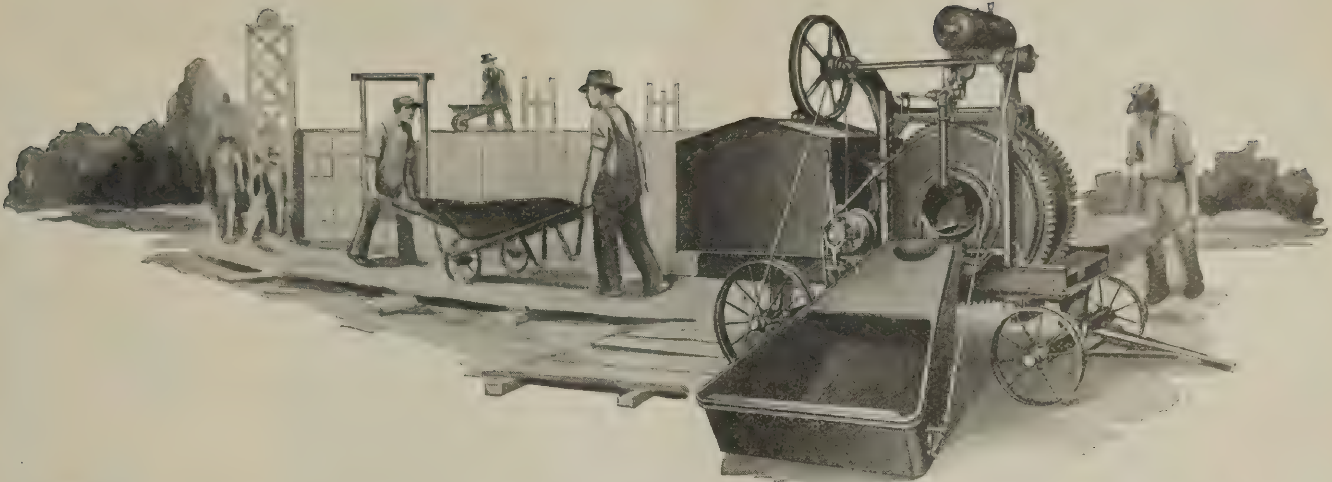
Any one of the 150,000 Kawneer Store Fronts successfully installed with our patented, resilient spring glass settings, points to the answer.

Contractors everywhere are building prestige by specializing in Kawneer Resilient Grip Store Fronts. Let us show you how you can make money in this line of work.

Write For Full Information To-day

THE
KAWNEER
COMPANY

2025 FRONT ST. NILES, MICH.



Will you buy this Dependable Mixer Now —or pay much more Later to idle Workmen

THE Dandie is the light mixer of over-strength construction—a record-breaker for continuous performance. It's not the cheapest in actual price, but the cheapest by "yardage cost"—that's what counts.

Koehring DANDIE

It's the lowest priced light mixer you can afford to buy and make sure of getting a mixer that is thoroughly dependable —proof against costly delays.

Dandie is the product of the largest makers of heavy duty mixers in America—Koehring. And it's Koehring-built—dependably built in every detail, employing many of the Koehring heavy duty features—the famous re-mixing action—the double gear drum drive—drum rollers keyed to shafts, and liberal bearing surfaces. It's built along heavy duty lines by men who *know* how to build mixers and build them *right*.

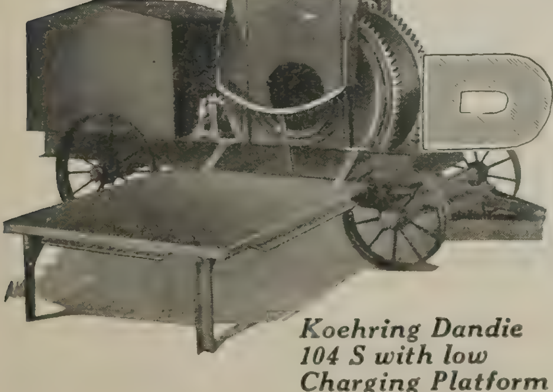
The enormous production scale on which Koehring operates—automatic machinery, standardized parts and processes and distinctive Koehring economies—have made it possible to market the Dandie Light Mixer at an extremely reasonable figure. It's the best buy in the light mixer field.

DANDIE SIZES

Sizes 4 and 7 cu. ft. mixed concrete May be equipped with low charging platform, charging skip or batch hopper, automatic water measuring tank and light duty hoist.

See the Dandie Catalog—get the facts—the "how's and why's" of Dandie's money-making performance. Use the coupon.

KOEHRING COMPANY
MILWAUKEE, WISCONSIN

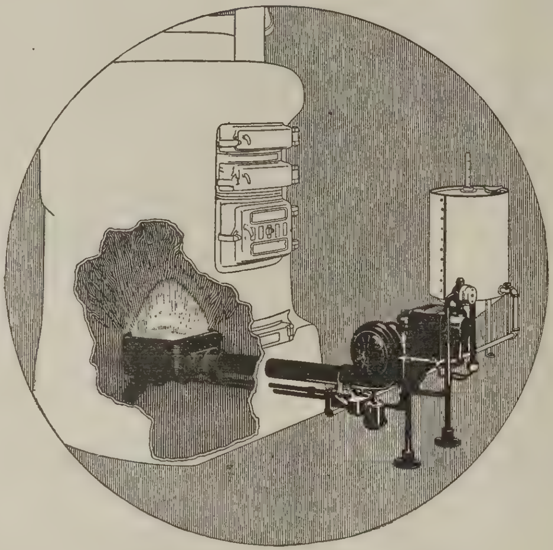


Koehring Dandie 104 S with low Charging Platform

DANDIE

KOEHRING COMPANY—MILWAUKEE, WISCONSIN
Please send me **DANDIE** *Catalog No. D* 4

Name ....
Address ....
City or Town .... *State* ....



Nokol is adaptable
to any type of furnace—
Steam, Hot Water
or Hot Air

Nokol
is on the Underwriters'
Laboratories list of
approved appliances.

Protected by the Doble Detroit Patents

The Opinion of Users Is the Strongest Nokol Recommendation You Could Ask or Give

More than six thousand Nokol heaters are now giving satisfactory service in homes. Some of these heaters have been in use for four years. Their users, who know their actual performance day by day, under all conditions, say far stronger things for Nokol than we are accustomed to say. The endorsement of Nokol by its users is in fact the basis of the rapid growth in the number of installations.

Nokol automatically delivers clean heat at precisely the temperature desired, through thermostatic control. No matter what the weather is, Nokol maintains an even temperature in the house. Nokol relieves the home of the drudgery and dirt of carrying coal and shoveling ashes, and the discomfort of uncertain, uneven heat. It is as superior to current methods of heating as electric light is to the tallow dip.

This is what Nokol users says. We will gladly send you complete descriptive literature and technical data, that show the mechanical basis of such performance.

THE STEAM CORPORATION
215 North Michigan Avenue, Chicago

NO COAL
Nokol
Automatic Oil Heating for Homes
Protected by the Doble Detroit Patents

MASTERPIECES IN MARBLE

A series of advertisements showing practical uses of Appalachian Marble.

SEE OUR CATALOGUE IN SWEET'S

Number Three Media County Court House Media, Pa.

In planning the interior trim for buildings in which you are especially interested, you will unquestionably wish to have those plans executed in something better than ordinary marble.

Appalachian Roseal Marble, with its exquisite finish and variegated beauty, has a richness and quality of coloring surpassing in beauty many of the most famous imported marbles.

It takes a high polish and will unquestionably satisfy the most exacting requirements.

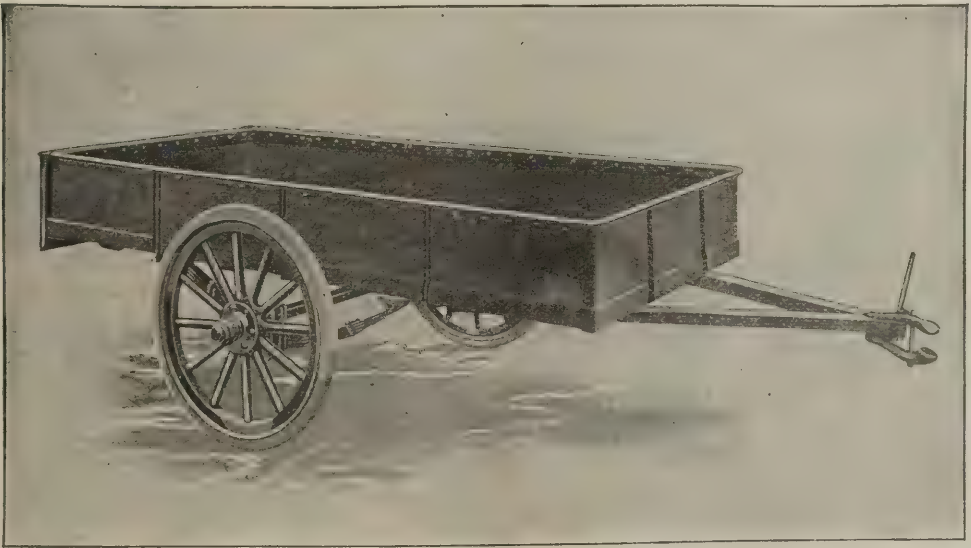
Write for samples of this and the other high quality marbles which we produce. Address Dept. E.

APPALACHIAN MARBLE COMPANY

KNOXVILLE - TENNESSEE

CONTRACTOR'S HANDY AUTO TRAILER

SPEED — ECONOMY — STRENGTH



Capacity—2,000 pounds. Body—8 feet long, 46 inches wide, 12 inches high. Body and under frame built of open hearth steel. Axles—1½ inch square bed, special high carbon steel. Springs—Semi-elliptic, oil tempered and double heat treated. Bearings—Roller. Wheels—1½ inch spoke, artillery type, second growth hickory. Tires—32-2, solid rubber. Weight—534 lbs. Other models with gates at front; also extension tongue which permits carrying lumber, poles, ladders, etc., 30 feet long.

Write for Catalog A

ALL STEEL TRAILERS — EVERY TYPE — 1 TO 10 TONS CAPACITY

ROGERS BROTHERS COMPANY **Albion, Penna.**

Be A Floor Surfacing Contractor

Make $5,000 to $15,000 or More Yearly

This is a new uncrowded field. Floor Surfacing Contractors are making big money re-surfacing old floors in homes and office buildings and working with general contractors who prefer to sublet the floor surfacing contract. It is a big business in itself. Business comes easily by American Universal Method. We furnish office forms, advertising cuts, business cards, mailing cards; in fact, everything to set a man up in business.

RE-SURFACING OLD FLOORS
Don't Ever Get Caught Out of Work Again—No Dull Seasons in This Business

There are hundreds of homes and office buildings being remodeled—in every case, the floor is the first consideration. There are hundreds of floors right in your own neighborhood that really need re-surfacing. Hundreds of people can well afford to have the work done and will be glad to have you do it when shown the American Universal Method.

This machine is electrically operated and surfaces more floors in a day than six men can do by hand. Works alike on new and old floors and on any size, from cottage to largest auditorium. Surfaces clear to wall without hand work. Contractors and architects prefer its work because it leaves no sander waves or chatter marks. Leaves job clean—vacuum fan leaves dust and dirt in bag. Machine will pay for itself the first month.

Contractors Make $20.00 to $50.00 a Day

I am making floor surfacing a specialty with the "American Universal" and find it a good paying proposition. My average earnings are $28.00 per day.—Geo. R. LaFlash, Mass.

My earnings in one day have been as high as $50.00 with the "American Universal" machine.—E. J. Inman, Ohio.

I make the "American Universal" way of floor surfacing a specialty now and my average earnings are at least $20.00 per day.—J. A. Natzel, Ariz.

We have owned one of your Floor Surfacing Machines for about two years. We find it earns us from $40.00 to $75.00 on each of our contract jobs.—F. B. Westcott & Son, Nebr.

I have made good with the "American Universal" machine. I have sanded out $700.00 worth of work in two months.—T. J. Easley, Tenn.

The "American Universal" is a dandy machine for cleaning and polishing dance floors. I have earned $62.00 clear profit in a day, so you can see how well I am doing.—Glen F. Bartlett, Ore.

When this little town of 6,000 people was building, we made from $350.00 to $700.00 per month with the "American Universal" but our best earnings per day have been $100.00, $80.15, $68.50, $62.00, and $80.00.—M. L. Derstine, Calif.

I have earned as high as $50.00 with my "American Universal" Machine and wish to thank you for the courteous treatment I have received from you.—Edward McKernan, Nebr.

I am very well pleased with the "American Universal." I have made $30.00 in eight hours with my machine.—R. E. Waynick, Texas.

Don't pass up this opportunity to get into a business of your own. Write TODAY for complete literature.

The American Floor Surfacing Machine Co.
Originators of Floor Surfacing Machines
521 SO. ST. CLAIR ST. TOLEDO, OHIO

The American Floor Surfacing Machine Co.
521 So. St. Clair St., Toledo, Ohio, U. S. A.

Gentlemen:

Please send without obligation to me, complete information and literature on your proposition. The following information will no doubt assist you in advising me.

☐ I want to become a Floor Surfacing Contractor.

☐ I am not now a contractor of any kind but was in following business:

....

☐ I am a Building Contractor and want to use it on my own contracts.

Name ....
Street ....
City ....State ....

HUTHER SAWS

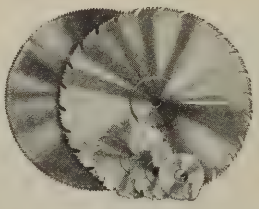
Mean Economical Production

Backed by an experience of more than 50 years in successful saw manufacturing, Huther Saws can be depended upon for their accuracy, durability and freedom from flaw.

HUTHER BROTHERS DADO HEAD

To facilitate intricate cutting and grooving. Consists of two outside cutters, and enough inside cutters to perform the required operation. Outside cutters can be used singly or in pairs as desired. May be obtained in many different sizes. We were the original patentees of this type of saw.

HUTHER BROTHERS HOLLOW GROUND SAWS



These saws are noted for the accuracy with which they are ground. Free cutting that leaves a smooth even surface. Now being used by hundreds of woodworkers, furniture manufacturers and cabinet makers.

Write for illustrated catalogue describing these and all other Huther Saws. Order the size you prefer by return mail and return if not satisfactory.

Huther Bros. Saw Mfg. Co.
ROCHESTER, N. Y.

LONG-BELL

TRADE MARKED LUMBER *and* TIMBERS

WHEN BUYING LUMBER—Consider Value As Well As Price

"Is it the best way to buy in the long run?" "Will it fill the bill?" are the questions to be answered before getting down to dollars and cents. In other words—there can be no compromise with poor lumber and timbers where strength and durability are the main essentials.

Behind every piece of Long-Bell lumber there is more than forty years of lumber experience and into every piece goes our reputation, because we brand our product with our trade-marked name. This means identification all the way from mill to user.

The Long-Bell Lumber Company's stands of long leaf Southern pine in the Calcasieu district recognize no superior among woods, commercially available, where strength and durability are essential. From tree to loading dock our products are subject to vigilant inspection and our strict adherence to the grading rules, together with careful manufacturing, results in lumber with a reputation for uniform high quality.

Upon request we will send to architects and contractors, without charge, a copy of our book, "From Tree to Trade," the story of lumber manufacture from the woods to the finished product. Please mention this magazine when requesting the book.

SOUTHERN PINE LUMBER AND TIMBERS; CREOSOTED LUMBER, TIMBERS, POSTS, POLES, TIES, PILING, WOOD BLOCKS; CALIFORNIA WHITE PINE LUMBER, SASH AND DOORS, STANDARDIZED WOODWORK; GUM AND OAK LUMBER; OAK FLOORING.

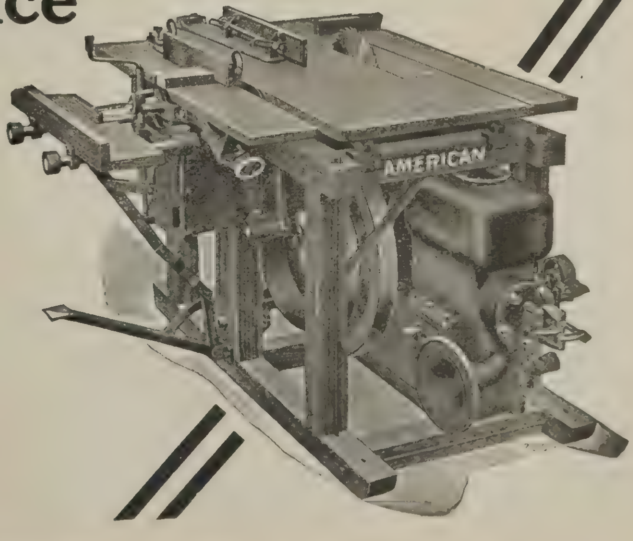
The Long-Bell Lumber Company
R. A. LONG BUILDING Lumbermen since 1875 KANSAS CITY, MO.

"AMERICAN"

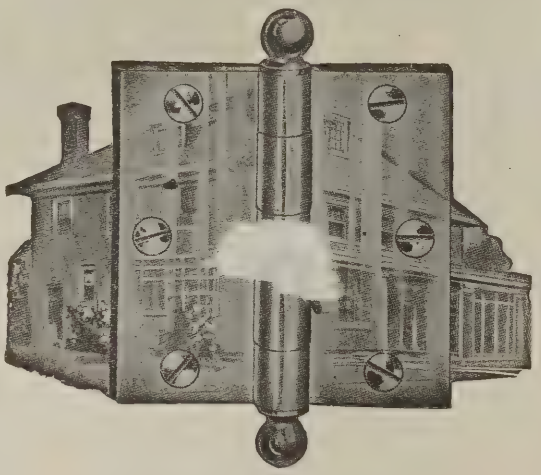
The Woodworker

For Service

Service is what you pay for—and, oftentimes, don't get—when you buy a woodworker. The "American" is full value—every dollar of its price pays for 100 cents worth of service-giving capacity. You can have it with built-in engine or motor, or mounted on skids with separate engine and band saw. Write for Bulletin 77 and the "American" catalog.



American Saw Mill Machinery Company
62 MAIN STREET HACKETTSTOWN, N. J.



Your

ATTENTION!!

is called to the hinges on the door. To some people door hinges may seem rather small and unimportant—nevertheless, their mission in helping to make or mar the appearance of the rooms in a modern home is worthy of serious thought. The

GRIFFIN

"The Door Butt of America"

is designed along lines that insure both beauty to the home and *service* whenever the doors are opened and closed.

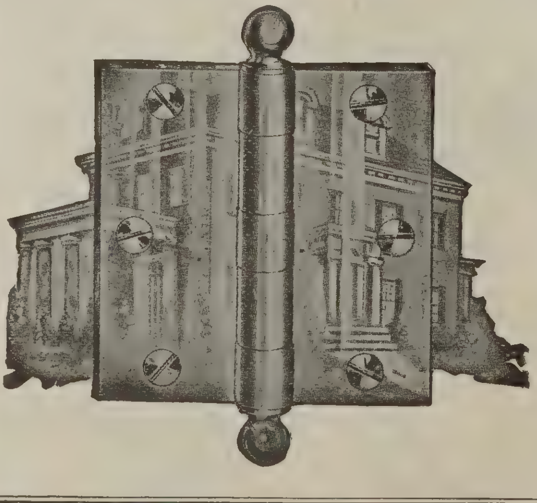
The Griffin operates freely and easily, it is amply strong for heavy doors and it is such a pleasing fixture that architects and home builders are glad to specify and use it.

Being finished in the various Griffin hardware finishes, it is in wide demand for the better class of houses and office buildings.

The Griffin Manufacturing Company
ERIE, PENNA.

45 Warren Street
New York

229 West Randolph Street
Chicago

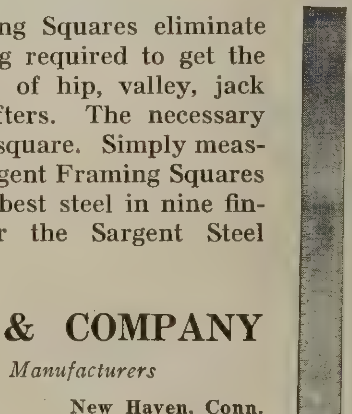


Good carpenters demand good tools

The more particular a carpenter is about the tools he uses, the more likely he is to select Sargent Planes and Squares.

Chief among the Sargent family of planes is the Auto-Set Bench Plane. With this plane you can remove the blade for sharpening and replace it again in exactly the same position, without readjustment. Made in six sizes. The Sargent book of planes will give full information about this and other Sargent Planes and will be sent free on request.

Sargent Framing Squares eliminate the usual figuring required to get the lengths and cuts of hip, valley, jack and common rafters. The necessary tables are on the square. Simply measure and read. Sargent Framing Squares are made of the best steel in nine finishes. Send for the Sargent Steel Square booklet.



SARGENT & COMPANY

Hardware Manufacturers

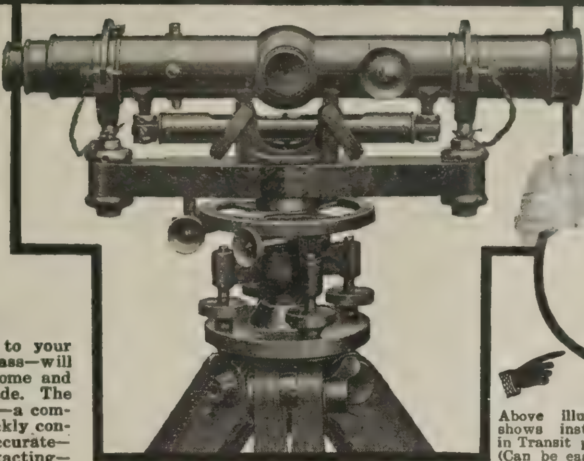
53 Water Street **New Haven, Conn.**

SARGENT
LOCKS AND HARDWARE

Level and Plumb With Your Own Instrument

$5.00

BRINGS IT TO YOU

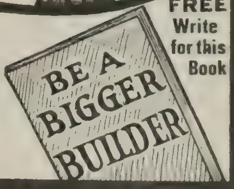


Free Trial

Order the Aloe—try it for 10 days—put it to the most rigid tests. If you are not pleased, return it at our expense and your $5.00 will be refunded.

Above illustration shows instrument in Transit position. (Can be easily and quickly converted.)

FREE
Write for this Book



Better, Quicker Work

This instrument will add immeasurably to your efficiency and put you in the big builder class—will do more to increase your business, income and prestige than any investment you ever made. The Aloe Convertible Level is the world's best—a combination of both level and transit and quickly converted to the use of either. Absolutely accurate—satisfies the requirements of the most exacting—yet so simple that anyone can use it.

Aloe Convertible Level and Transit Combined

You Learn to Use It In An Hour

No technical knowledge necessary. No previous experience needed. With our simple and complete instruction book, included free with every level, you can immediately put the instrument to work. It is a level and transit combined—takes sights either above or below the horizontal. You can use it for leveling foundations, walls, piers, streets, walks or curbings—to run straight lines for ditches or drains—boundary lines for fences or trees—surveying lots and fields—plumbing walls, shafts, trestles, posts and pillars.

Easy Monthly Payments

Just $5.00 brings it to you—for a free trial. If perfectly satisfied, pay the balance in small monthly payments. The instrument will be sent at once and from the first day it will be working for you—paying for itself by saving you the cost of borrowing an instrument or the fees you have been paying other men for this work.

Write for Free Book

Our free book—"Be A Bigger Builder"—tells you how to increase your income—how to get the profitable jobs and become a bigger man in your community. Write for this book today.

A. S. ALOE CO., 622 Olive St., St. Louis, Mo.

MAIL COUPON TODAY

A. S. ALOE CO., 622 Olive St., St. Louis, Mo.

Without obligation, send me your FREE book, "Be A Bigger Builder". Also full particulars about the Aloe Convertible Level and details of your easy payment plan.

Name____________________________________

Address__________________________________

"Your Parks Machines are the best I ever saw, and I've been running woodworking machines all my days!"

—W. T. MARTIN

PARKS
Planing Mill
Special
$475.00
Send for Catalog

Mr. Martin at his Planing Mill Special

W. T. Martin of Emporia, Kansas, is a carpenter and builder whose opinion carries the weight of 50 years of experience. The Parks Planing Mill Special is eight machines in one. You can do everything in woodworking with it. Rips, cross-cuts, mortises, tenons, is equipped with band saw, sander, etc. Works any timber a man can handle.

The Parks Ball Bearing Machine Co.
STATION A CINCINNATI, OHIO
Chicago Office and Show Room: 617 Machinery Hall
Canadian Factory: 200-210 Notre Dame, East, Montreal
Western Office and Warehouse: 1113 Farnam St., Omaha

WOODWORKING PARKS MACHINES

Do You Know Why Shinn-Flat Business Is Good When Other Lines Are Quiet?

Woven in a continuous flat cable of pure copper wires 1-inch wide, with greater carrying capacity for electricity.

During this year, when practically every line selling to the farmer slumped way down, the business of selling Shinn-Flat Lightning Protection ran about 85% as heavy as last year, which was the greatest year in our history.

Remember, also, this was in the face of very little building, on account of high material costs for most of the year.

Our own figures, and the figures of our principal Dealers, prove this. In fact, many of our Dealers have shown an increase in 1921 business over 1920.

You may wonder why this business has been good when so many other lines have been almost dead. This is the reason. When money is scarce, and times are rather dull, and everyone is a little uncertain about the future, people want to protect and hold what they have. They can't afford to take chances on losses. Therefore, the Lightning Protection business is good, just as most insurance business is good. And it is natural that it should be so—it is mighty good sense for people to protect the homes and other property they have.

1922 will be a bigger year than 1921 for this business, for there will be considerable new building, and almost all new buildings are protected from Lightning as soon as finished—especially when a Shinn-Flat Dealer is on the job.

You ought to represent a live business like this. We shall be glad to explain it to you fully, if you will write us.

W. C. Shinn Mfg. Company
1231 LYTTON BLDG. CHICAGO, ILL.

Shinn-Flat

Lightning Rods Are Superior

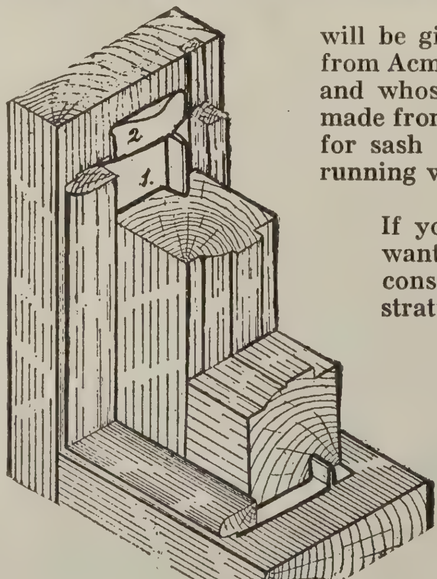
Electricity travels only on the surface, consequently only surface wires are of any potential value in carrying current. Every wire in Shinn-Flat is a surface wire, giving it greater capacity. There are no buried wires, or useless material, as in old-fashioned round cables. Shinn-Flat is the only lightning rod woven in such form as to allow for expansion and contraction, with changing temperatures.

Shinn Tops are extra heavy, made of copper tubing, with silver tipped points, held permanently in place with patented self-locking four-legged brace.

Only Good Contractors Need Apply

Exclusive rights on a quota basis for the installation of

ACME CUSHION WEATHER STRIP



will be given only to those carpenters and contractors who will learn from Acme experience the correct way to install this simple weather strip and whose activity and ability as workmen warrant the profits to be made from an exclusive proposition. The Acme Cushion feature provides for sash expansion and contraction at the same time, insuring a free running window, but tight.

If you feel that you can qualify, describe the territory that you want and state why you can guarantee covering it. Your outfit will consist of special tools, which we'll supply at cost, a sample demonstrating model (like the illustration herewith), material and instruction sheets showing just what to use for various conditions, and a small quantity of stripping.

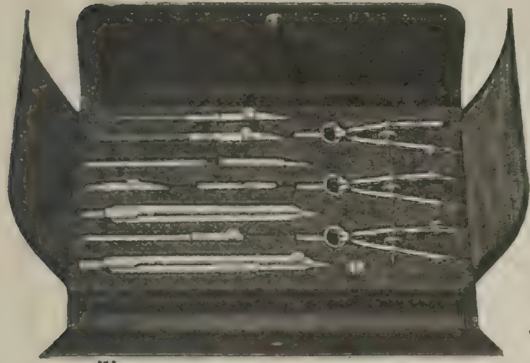
Get your application in today. You'll be given a chance for exclusive rights unless someone else gets ahead of you.

The Acme Weather Strip Company
3 Circle Street, Rochester, N. Y.

For This Original and Only CUSHION Weather Strip

Special Offer

TO ARCHITECTS, ENGINEERS, DRAUGHTSMEN



Set No. 1092, Regent—$24.00, subject to discount.

We illustrate a set of our new Regent Drawing Instruments, improved in pattern and of the very highest quality. These instruments are of the official standard used in all technical colleges and drafting rooms. Price $24.00, subject to discount.

At this very moderate price, these instruments are an unusually good buy—one to be taken advantage of. Fuller explanations in Circular B.L., sent on request.

WRITE TODAY!

NEW YORK BLUE PRINT PAPER CO.

Sensitized Papers, Drawing Material, Drafting Furniture

102 Reade Street New York City

NYB

Another Room Without the Cost of Building It!

THAT'S just what is being done in thousands of homes and apartments today. Here's an interesting example. See the above photograph—it shows part of a group of 68 two-family apartments being erected by Mills & Sons, Chicago. Each apartment on the second floor has been increased from five to six rooms. How? By installing the Murphy In-A-Dor Bed! But the cost of this additional room has been saved—and think of the tremendous saving in heating, furnishing, lighting, decorating, and household drudgery.

The MURPHY IN-A-DOR BED

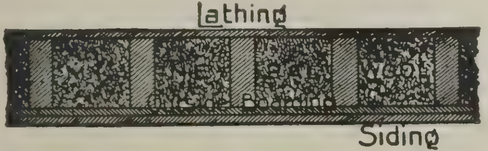
The Murphy In-A-Dor Bed is a sanitary—comfortable—all metal—a "regular" bed (full size or twin) pivoted to the jamb and threshold of a standard closet door. The simple mechanism enables it to swing through the doorway—and to be lowered into place with utmost ease. This bed is perfectly balanced—it cannot close up accidentally. The bed clothing is kept in place in any position.

We have a complete technical service department which is co-operating with architects and builders. We will help you with your floor plan scheme. No charge or obligation whatever. We will be glad to furnish you with specifications and detailed information. (Write for illustrated and descriptive folder on the Murphy Ironing Board and Cabinet.)

**There is only one "In-A-Dor" Bed—
"IT'S A MURPHY"**

THE MURPHY DOOR BED CO.

22 West Monroe Street, Chicago
469 Fifth Avenue, New York
1534 Blake Street, Denver
912 Kresge Bldg., Detroit, Mich.
205 O'Connor St., Ottawa, Can.
Crocker Bldg., San Francisco
Chemical Bldg., St. Louis
709 Second Avenue, Seattle, Wash.
1140-1142 Hanna Bldg., Cleveland
1021-23 Grand Ave., Kansas City, Mo.
220 N. St. Paul St., Dallas, Texas
204 Peach Tree Arcade, Atlanta, Ga.



Section of Outside Wall of House, Showing Wool Between Studding.

Mineral Wool for Building

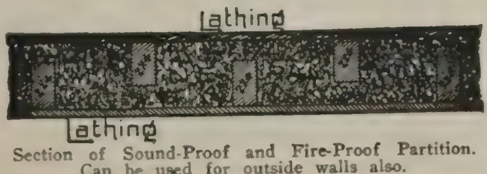
Mineral Wool has superseded all other materials used for similar building purposes because it does "a great work at little expense." A house lined with Mineral Wool has an indestructible, fireproof and vermin-proof guard; it protects the entire household. In the winter time it keeps the cold air out, facilitating proper heating and economy in fuel. In the summer it keeps the heat out.

This material, being of fibrous, inelastic composition, acts as a deadener and muffles all sound. It is considered the best insulator material on the market, making it a perfect refrigerating machine.

Mineral Wool makes life-long friends of all its users. If you are skeptical as to its power, let us demonstrate. We can prove all claims. Write us to-day.

U. S. Mineral Wool Co.

280 Madison Avenue, New York
[Cor. 40th Street]



Section of Sound-Proof and Fire-Proof Partition. Can be used for outside walls also.

"See A Model Before You Build"

Small Homes of Character

A PLAN BOOK CONTAINING FIFTY
ATTRACTIVE ....HOMES
ECONOMICAL ....HOMES
INVESTMENT ....HOMES
WELL LIGHTED ....HOMES
WELL VENTILATED .....HOMES

Cardboard models in color, blueprint working drawings, specifications, and bills of material, available for each house.

Price of our plan book, "Small Homes of Character," postage prepaid $1.00

ARCHITECTURAL HOUSE PLANNING SERVICE CO.
20 SO. 18th STREET PHILADELPHIA, PA.

Shipping Sheldon's Slates from the Quarry in Mid-winter.

The fact that

SHELDON SLATES
RED, GREEN, PURPLE, BLACK

are piled up outdoors, without any protection from the elements, is one of the strongest possible evidences of their durability for roofing purposes.

Contractors, Roofers, Property Owners: Let us show you why Sheldon's Slates make the most economical as well as the longest-lived roof.

F. C. SHELDON SLATE CO.
GRANVILLE, N. Y.

FORSTNER
Labor Saving
AUGER BIT

Bores Any Arc of a Circle

Many New Uses

The Forstner Auger Bit, unlike other bits, is guided by its circular rim instead of its center, consequently it will bore any arc of a circle, and can be guided in any direction regardless of grain or knots, leaving a true polished surface. Takes the place of a chisel, gouge, scroll-saw, or lathe tool combined. For core boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon molding and mortising.

Try it and be convinced.

The PROGRESSIVE MFG. CO.
TORRINGTON, CONN.

Sollie Arronson, Owner.
Errdman & Barnett, Architects, Los Angeles, Calif.

It Beautifies

Bay State Brick and Cement Coating truly expresses the architect's ideas of beauty for cement and stucco buildings. Many leading architects specify it.

Bay State waterproofs all walls of brick, cement, and stucco. It is a permanent seal against dampness and rain. Write today for samples in white and colors, and booklet No. 19.

Wadsworth, Howland & Co., Inc.
Paint and Varnish Manufacturers
Boston, Mass.

New York Office
Architects' Bldg.

Philadelphia Office
1524 Chestnut Street

BAY STATE
Brick and Cement Coating

TRADE MARK Reg. U.S. Pat. Off. THE BAY STATER

A Satisfactory Store Front

A Coulson constructed store front always pleases. It is easy to put up. It takes less time and shows bigger profit for the contractor. When installed, it is the pride of the street.

COULSON

Store Front Construction

It is adaptable to any type of building.
It is furnished ready to set into place.
It is. attractive, substantial and durable.
It provides a safe setting for the glass.
It receives the glass from the outside.
It provides easy installment of awnings.
It is endorsed by insurance companies.

The strongest and most durable store front construction made. Creosoted wood encased in 18 gauge pure copper and reinforced with steel tees throughout.

Write for our blue print specifications and catalogue.

THE J. W. COULSON & COMPANY
95-107 West Spring Street Columbus, Ohio

The Home Building Spirit

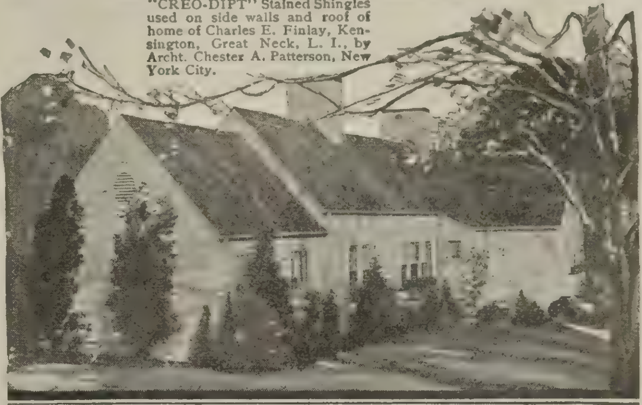
"CREO-DIPT" Stained Shingles are so adaptable to detail and to color arrangement that they are specified by this country's prominent architects.

Either for a variegated color scheme or for a simple one color scheme, "CREO-DIPT" Stained Shingles meet the anticipation.

The "CREO-DIPT" contribution to real "home" building is made possible in this bungalow by three shades of green stained shingles for a variegated roof effect and by the 24-inch "Dixie White" Stained Shingles on the side walls.

Send today for Portfolio of Fifty large Photographs of Homes by Prominent Architects as well as color samples. Ask about "CREO-DIPT" Thatch Roofs and 24-inch "Dixie White" Side Walls for the true colonial white effect.

CREO-DIPT COMPANY, Inc.
1030 Oliver St., North Tonawanda, N. Y.



"CREO-DIPT" Stained Shingles used on side walls and roof of home of Charles E. Finlay, Kensington, Great Neck, L. I., by Archt. Chester A. Patterson, New York City.

Portfolio of Homes

"CREO-DIPT" *Stained Shingles*

Better Blue Prints

Your blue print making can be rendered a pleasurable task by the simple expedient of installing a WICKES Blue Print Machine.

Accurate prints are a certainty, production is increased, one-half the time is required as compared to old fashioned processes, operation is simple, distribution is uniform, tone of color same all over and the prints are rendered many times more legible. Write us for details.

WICKES BROTHERS
1301 Water Street Saginaw, Mich.
501 Fifth Avenue New York

—in half the time!

STOVER FIREPLACE DAMPERS

For Greatest Heating Efficiency

Contractors and Builders who want to give their customers the very best in fireplace construction install Stover Dampers in the chimneys of the fireplaces they build.

Stover Dampers support the brick work, form a smooth throat, regulate the draft perfectly, increase the efficiency, save fuel and reduce the labor cost of erecting fireplaces. The price is low enough so a Stover Damper of suitable size can be used in every fireplace.

Mail Coupon for Book

Send this coupon today and have us send you a free book on Stover Fireplace Dampers and Fixtures including Andirons, Baskets, Sets, etc.

Dealers and agents write for territory and discounts.

Stover Manufacturing & Engine Company
St., Freeport, Ill.

Stover Manufacturing & Engine Company
747 Lake St., Freeport, Ill.

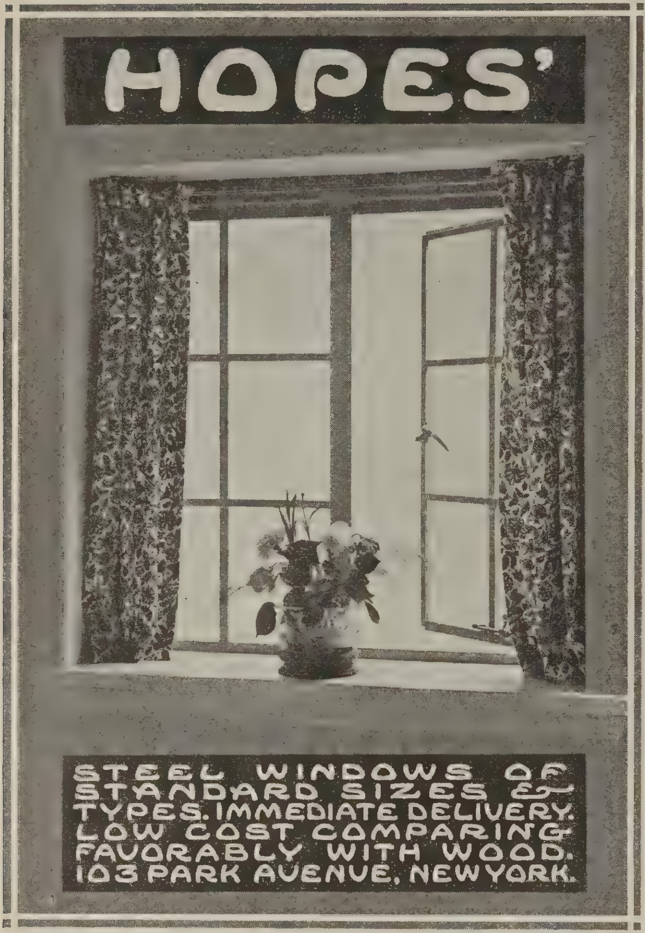
Please send me your Fireplace, Damper and Fixture Book.

Name..

Business..

Address..

City..



HOPES'

STEEL WINDOWS OF STANDARD SIZES & TYPES. IMMEDIATE DELIVERY. LOW COST COMPARING FAVORABLY WITH WOOD. 103 PARK AVENUE, NEW YORK.

BOYLE'S BAYONNE
JBCo
ROOF AND DECK CLOTH

Reg. U. S. Pat. Off.

is the accepted standard of roofing canvas

BAYONNE

may be imitated but it cannot be duplicated

Carpenters and builders the country over have for years used Bayonne as a covering for the roofs and floors of piazzas, sun parlors, sleeping porches, etc.

It is absolutely waterproof. Requires no white lead bedding yet lays flat. It has proved its efficiency by long years of service.

Write to the manufacturers for sample book "R"

John Boyle & Co., Inc.

Established 1860

112-114 Duane St. NEW YORK 70-72 Reade St.
Branch: 202-204 Market Street, St. Louis

Plenty of Hot Water

The first essential in a well planned home

ECONOMY

Combination Boiler and Gas Water Heater with Positive Thermo Valve Control

A reasonably priced piece of equipment which renders instant and continuous hot water service on the storage principle, with a marked saving in consumption of gas. Specify for the bungalow, residence, two-flat building, three-story detached apartment, club and play-ground showers, factory lavatories, restaurants, etc.

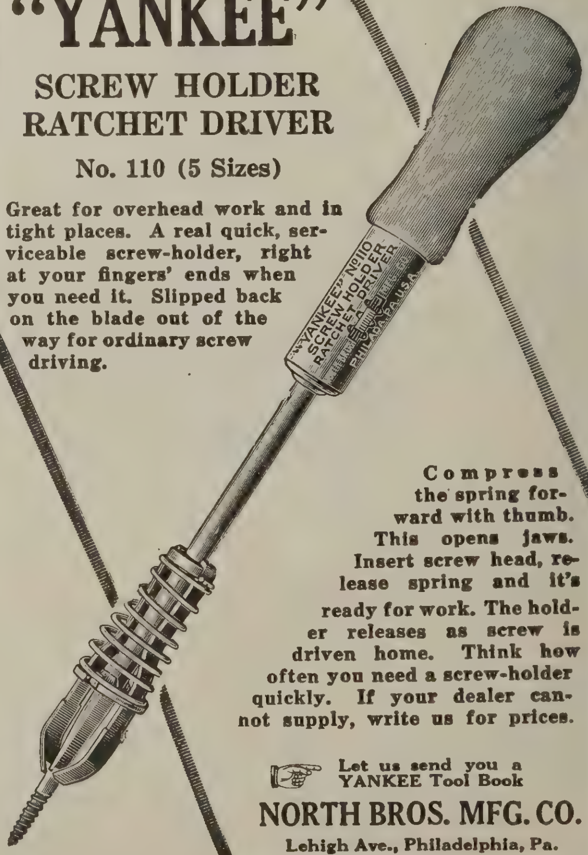
Refer to Sweet's Architectural Catalogue for specifications, size, suggestions, etc., or write us for full information.

Economy Heater Co.
108 So. LA SALLE ST.
CHICAGO, ILL.

"YANKEE"

SCREW HOLDER RATCHET DRIVER

No. 110 (5 Sizes)



Great for overhead work and in tight places. A real quick, serviceable screw-holder, right at your fingers' ends when you need it. Slipped back on the blade out of the way for ordinary screw driving.

Compress the spring forward with thumb. This opens jaws. Insert screw head, release spring and it's ready for work. The holder releases as screw is driven home. Think how often you need a screw-holder quickly. If your dealer cannot supply, write us for prices.

☞ Let us send you a YANKEE Tool Book

NORTH BROS. MFG. CO.
Lehigh Ave., Philadelphia, Pa.

Compo-Board

None Genuine without the WOOD CORE

You Can't Mistake It

Compo-Board is instantly recognized by its exclusive, patented wood core. It will pay to look for this outstanding feature. It means greater strength, rigidity and durability.

Compo-Board is made of kiln-dried wood slats cemented together between a heavy, tough, moisture-proof covering. It cannot shrink, warp or buckle. It is remarkably resistant to heat, cold, sound and fire.

Use Compo-Board instead of plaster or for covering old cracked plaster walls, ceilings, partitions, etc. Nails and saws like lumber.

Write for sample and interesting booklet.

The Compo-Board Company
5778 Lyndale Avenue North, at 44th
MINNEAPOLIS, MINNESOTA

The **FIRMNESS, DURABILITY** and **ATTRACTIVENESS** of **AMERICAN BRAND SCREEN WIRE CLOTH** will appeal at once to the architect, home builder, or screen manufacturer who desires to give maximum Fly Screen satisfaction.

AMERICAN BRONZE: This grade is made of best hard drawn wire 90% copper, 10% non-corrosive alloy, principally zinc. **BRONZE** should last as long as the house in most sections.

GALVANOID: This grade is heavily electro-zincked **after** weaving, then varnished. It is the recognized leader in its field—the **best** grade of zincked cloth made.

We also make

PAINTED, GALVANIZED, COPPER, MONEL

and many special grades of wire cloth. Samples and descriptive literature sent upon application.

Order from your Hardware Jobber or Dealer. If he cannot furnish, advise us, and we will see that you are supplied.

AMERICAN WIRE FABRICS CO.
CHICAGO, ILL.
FACTORIES: Chicago, Ill. Mount Wolf, Pa.

In-Lade

Design Roofing

Meets the big demand for a roofing that combines distinctive appearance with permanence.

It is easy to apply and may be laid over wood shingles, keeping the house warm in winter and cool in summer.

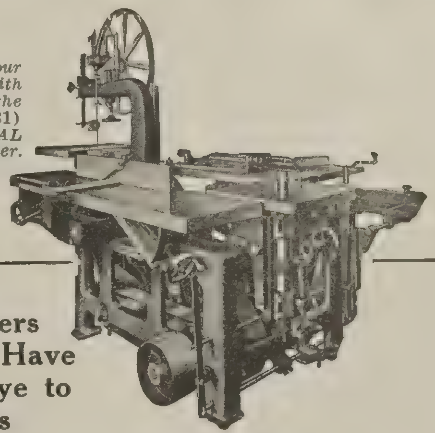
Send for samples to show your customers. In-Lade roofing will help you build up your roofing business. It is made in rolls of red, green and white. Approved by the National Board of Underwriters "Class C."

AMALGAMATED ROOFING CO.
431 South Dearborn Street Chicago, Ill.

Eastern Office:
Fulton Building
Pittsburgh, Pa.

Southern Office:
18 South 20th Street
Birmingham, Ala.

Send for our booklet with facts about the (Famous 31) UNIVERSAL Woodworker.



Builders Who Have An Eye to Profits

prefer the

SIDNEY UNIVERSAL WOODWORKER

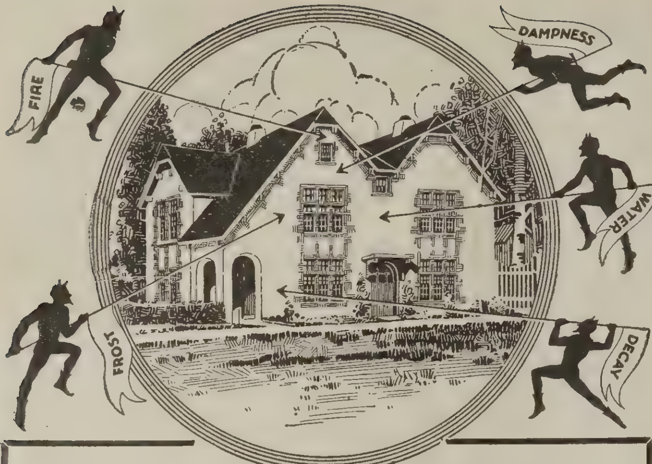
because it is a

LABOR SAVER
TIME SAVER
TROUBLE SAVER
MONEY SAVER

Can do anything any woodworking machine can do in less time.

Write us today for pictures, prices and particulars on "Sidney" Famous 31

SIDNEY MACHINE TOOL CO.
SIDNEY OHIO



A KELLASTONE HOME

DEFIES THE WEATHER ELEMENTS

Watch out for the destructive weather elements when you build. Heed the warning of the experienced contractors and architects and choose a building material that will not fall prey to the ravages of rain, snow, heat and cold. As evidence of this, we point to the thousands of buildings which stand as a lasting tribute to

KELLASTONE
IMPERISHABLE STUCCO

KELLASTONE is the original magnesite stucco—a scientifically balanced composition that does not contain a particle of lime, gypsum or portland cement. It does not crack like ordinary stucco; sets up in a hard stone-like mass. Beware of imitations. Make sure you get the original Kellastone—look for the name on every sack.

NATIONAL KELLASTONE COMPANY
Room 517 155 East Superior St., Chicago, Ill.

EDWARDS

Embossed Metal Ceilings and Side Walls

Are sanitary, Durable, Fire-proof, Germ-proof. Made from sheets of specially prepared steel and stamped into ornamental designs. Each plate re-squared after stamping; easily erected by any mechanic.

Can be applied on new or old buildings; no danger from falling plaster, no re-papering necessary.

Send us a rough sketch of rooms showing all off-sets, etc., and we will prepare, without any charge, a drawing showing how the ceiling will look when erected, and forward same together with a lump price for materials delivered f. o. b. your railroad station.

Our large Catalog showing our complete line of Ceilings and Walls sent free on request.

THE EDWARDS MANUFACTURING CO.
423-443 Eggleston Ave. CINCINNATI, OHIO
The World's Largest Manufacturers of Metal Roofing, Metal Shingles, Metal Spanish Tile, Metal Ceilings, Metal Garages, Portable Buildings, etc.

Be A

Weatherstrip Contractor

$5000 Per Year Men Needed

One of our contractor agents started in business for himself about two years ago and in this short time is handling jobs such as the great Sommerset Hotel of Chicago. He has grown from a one man organization to 2 salesmen and several mechanics. He's making money hand over fist.

Opportunities in Small Towns Too

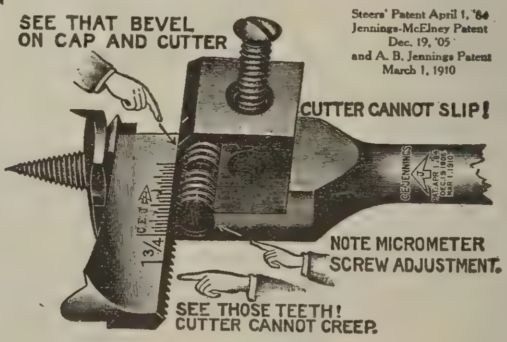
Not only are our big town agents making good but also those in the smaller communities are becoming independent.

> "I have plenty of work and orders are coming in all the time," writes Geo. Whiting of Collingswood, N. J.

Letters like this are coming in daily from hundreds of our contractor-agents throughout the United States.

Don't pass up this opportunity. It's an all year business—and a business of your own, requiring little capital. We assist you to get contracts. Write for our selling plan.

Allmetal Weatherstrip Company
122 West Kinzie Street Chicago, Ill.


SEE THAT BEVEL ON CAP AND CUTTER
Steers' Patent April 1, '84
Jennings-McElney Patent
Dec. 19, '05
and A. B. Jennings Patent
March 1, 1910
CUTTER CANNOT SLIP!
NOTE MICROMETER SCREW ADJUSTMENT.
SEE THOSE TEETH! CUTTER CANNOT CREEP.
1 3/4
C.E.J.
C.E. JENNINGS
PAT. APR 1.84 DEC.19.1905 MAR 1.1910

A Gift He Will Enjoy Using

A C. E. JENNINGS Arrow Head Steers' Expansive Bit for Christmas. He will enjoy using it because it cuts varied sizes of holes perfectly, the adjustment is quick and positive and slipping of the cutters is simply an impossibility.

If your dealer cannot furnish, we will ship, prepaid, one of these tools upon receipt of the $3.50. Your order will receive immediate attention and the tool is packed in attractive holiday box. Write us immediately.

C. E. JENNINGS COMPANY
New Haven Office: 321 Winthrop Ave.
NEW HAVEN, CONN.

Richards-Wilcox

House Door Hangers

There is an added convenience as well as dignity in a vanishing French door. Such a door lends beauty to any home.

Every day sees an increasing number of homes being equipped with convenient vanishing French doors. The home builder is learning that the old-time sliding door type, with its faults, has been completely eliminated by the new R-W house door hanger—the hanger that allows the door to be easily and quickly operated without noise or jar of any kind. The special adjustment feature of R-W house door hardware makes it a general favorite with builders.

Write today for our New Catalog NC-4

Richards-Wilcox Mfg. Co.
A Hanger for any Door that Slides.
AURORA, ILLINOIS, U.S.A.
CHICAGO ST. LOUIS LOS ANGELES PHILADELPHIA CLEVELAND — INDIANAPOLIS LONDON, ONT. BOSTON NEW YORK MINNEAPOLIS SAN FRANCISCO

Easy to Install
Costs less than Cords and Weights
PULLMAN

A Pair of Hands and a Screw Driver will do the Work

The Pullman Sash Balance

PULLMAN Sash Balances are constructed on the Unit System. There are three units K, L and M, adaptable to any style of sash in any kind of a building. Anyone can install the Pullman Unit Sash Balances with ease and rapidity.

Economy—Using Pullman Sash Balances saves money on every window over the old-fashioned cords and weights—besides making a better construction.

Efficiency—All the parts are carefully fitted and, being of pressed steel, are absolutely accurate so there is nothing to rattle or squeak. The sash is so perfectly balanced that a child can operate it.

Durability—The Pullman Unit Sash Balances are practically indestructible. All moving parts are encased. The Pullman Unit Sash Balance carries a ten-year guarantee. Write for illustrated catalog explaining the many money-saving features of this Balance.

PULLMAN MFG. CO.
8 Industrial Street Rochester, N. Y.

Pullmanize Your Windows

You Can Make Imitation Marble, Onyx, Etc., with the "ARTISTO" Processes

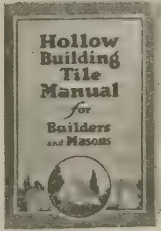
Here is a business that builds up profits—you can conduct it with your present equipment. Make artificial marble, onyx, porphyry, alabastro, granite, etc., by the "ARTISTO" Processes which we furnish. We license you to manufacture and do not restrict you as to where you sell the goods you manufacture. We sell no machinery—only the processes and formulas. You can accomplish wonderful results, the work is pleasurable and profitable. The first cost is the only cost. Write us for details.

ART STONE COMPANY
Box 500 WAYNESBORO, PA.

THIS BOOK —

Tells you the expert's way of laying Hollow Tile.

Send for Your Copy—It's Free



When you remember that Hollow Tile is fireproof, needs no paint, and costs only 5% more than wood, you realize that it's the coming building material.

It's to your interest to be informed. Send for Manual for Builders and Masons.

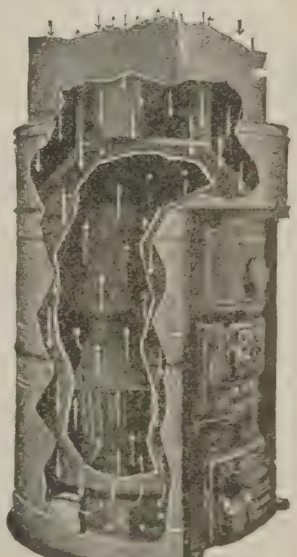
The Hollow Building Tile Association
Dept. 1912 Conway Building, Chicago, Ill.

HOLLOW TILE

The Most Economical Form of Permanent Construction

The

EMPIRE PIPELESS



Wherever individual stoves for heating separate rooms are used an opportunity exists for installing the Empire Pipeless Furnace.

This efficient, economical, centralized heating plant may be used in schoolhouses, churches, stores and homes. It does away with the necessity for constant attention to a number of fires and the danger they involve.

Any fuel—hard or soft coal, coke, wood or gas—may be burned in the Empire Pipeless.

Catalog mailed on request.

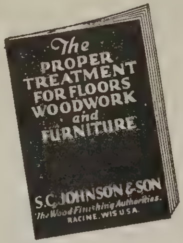
CO-OPERATIVE FOUNDRY CO.
ROCHESTER, N. Y.
Western Branch: 505 S. Clinton St., Chicago
Makers of the celebrated Red Cross Stoves and Ranges

CORTRIGHT METAL SHINGLES

When it comes to Galvanized Shingles, use Cortright Hand Dipped. They are first formed of prime roofing tin and then coated separately in a zinc bath, receiving a heavy coating on both sides.

CORTRIGHT METAL ROOFING CO.
Philadelphia — Chicago

Valuable Book on Wood Finishing—FREE

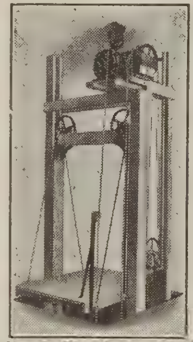


It's the best book ever published on Artistic Wood Finishing—the work of famous experts—illustrated in colors. Tells how to finish soft woods in beautiful stained effects with **Johnson's Wood Dye** and in enameled effects with **Johnson's Perfectone Enamel.** This book is written for the practical man—contractor, builder, architect, interior decorator, painter, etc.

HOW TO GET IT FREE

If you are interested in beautiful interior finishing, write us for a copy of *"The Proper Treatment for Floors, Woodwork and Furniture."* We will gladly send it free and postpaid. Please mention the name of the firm from whom you buy paints, varnishes, etc.

S. C. JOHNSON & SON, Dept. B. A. 12, Racine, Wisconsin
"The Wood Finishing Authorities"



No. 3 Electric for Light Service

ELEVATORS

A COMPLETE LINE

PASSENGER PUSH BUTTON
FREIGHT ELECTRIC
AUTOMOBILE HAND POWER
DUMB WAITERS

We can change your hand power to electric.

KIMBALL BROS. CO.
COUNCIL BLUFFS, IOWA
1106 NINTH STREET

610 Delaware
Kansas City, Mo.

201 Scott Thompson Bldg.
Oklahoma City

523 Boston Bldg.
Denver

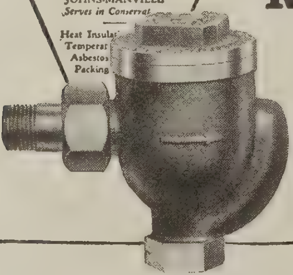
DUMB WAITERS

AND HAND POWER ELEVATORS

for difficult conditions present no problem to builders who let SEDGWICK cooperate with them. During our 30 years of experience we've handled thousands of such problems. Most requirements we can meet by immediate shipments from our large stock. But even special orders can be filled on very short notice, owing to our long experience and large facilities. Let us cooperate for the service of your clients. Get catalog.

SEDGWICK MACHINE WORKS
156 West 15th Street New York
120-48

JOHNS MANVILLE SERVICE
COVERS THE CONTINENT
Through—
Asbestos
and its allied products
JOHNS-MANVILLE
Serves in Conservat
Heat Insula
Tempera
Asbestos
Packing



JOHNS-MANVILLE Radiator Trap

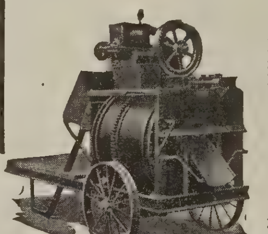
—one of a dependable line of building materials, including Asbestos Roofings, Insulation, etc.

JOHNS-MANVILLE, Inc.
Madison Ave., at 41st St., N. Y. City
Branches in 60 Large Cities

This is the DAY of

SMALL MIXERS

Contractors, to-day, find that it pays to own several small concrete mixers rather than one large one. Thus, they can have mixers on several jobs at once or they can put them all on one job and get better results.



ARCHER MIXERS

Light—compact—can be moved by one man. Discharge direct into forms in 15 seconds. No wheelers needed. Two sizes—bag and half-bag.

Archer Mixers will cut your costs. Write for special prices now in effect.

ARCHER IRON WORKS
2442 West 34th Place CHICAGO

Will do 15 Different Kinds of Work

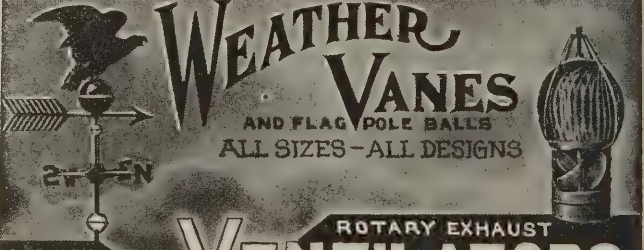
THE CRESCENT UNIVERSAL WOODWORKER

For Accuracy and Convenience

SAVES TIME AND LABOR

Write for Catalog of Wood Working Machines

The Crescent Machine Co.
206 Main St.
Leetonia, Ohio



WEATHER VANES
AND FLAG POLE BALLS
ALL SIZES—ALL DESIGNS

ROTARY EXHAUST
VENTILATORS

for Chimneys, Barns, Chicken Houses, Factories, etc.
Increases draft, prevents down draft, exhausts foul air.
Produces vacuum by rotation.

Write For Catalogue

E. G. WASHBURNE & CO., 208 FULTON ST., NEW YORK

Here's An Axe

That has the "Old Fashioned" Quality: You know what that is.

Have your dealer show you one and just see the difference.

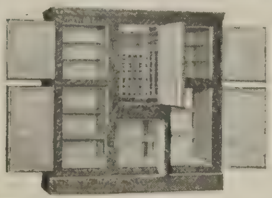
It's a Real Tool!

THE L. & I. J. WHITE CO.
BUFFALO, N. Y.

McCRAY

REFRIGERATORS FOR ALL PURPOSES

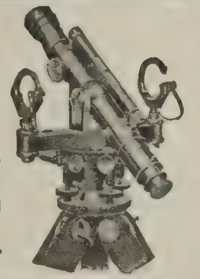
As your clients have confidence in your ability and depend upon your judgment, so architects—who know us—depend upon McCray Refrigeration. **FREE PLANS**—Send us a rough sketch of your client's refrigerator requirements—we will gladly make up blue prints and draw up specifications.



Send for catalog—
No. 95 for Residences; No. 53 for Hotels, Clubs, Hospitals, etc.; No. 72 for Grocery Stores; No. 64 for Meat Markets; No. 75 for Florist Shops.

McCray Refrigerator Co.
2164 Lake St. Kendallville, Ind.
Salesrooms in all Principal Cities

SAVE MONEY Buy Builders Instruments Direct From the Factory



WISSLER PATENTED LEVEL

A Transit and Level Combined in One Instrument

Also a complete line of transits, levels, etc., for Architects, Contractors, Surveyors and Engineers. Thirty years' experience in making guaranteed instruments. Write for descriptive literature and prices.

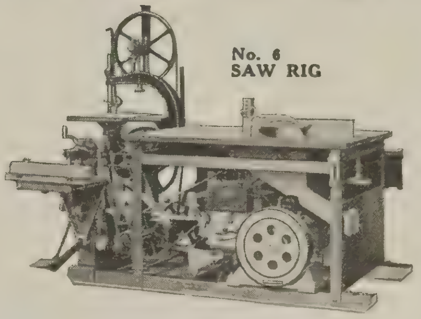
WISSLER INSTRUMENT CO.
609 N. Broadway, St. Louis, Mo.

Special facilities for repairing and adjusting used instruments. Reasonable prices.

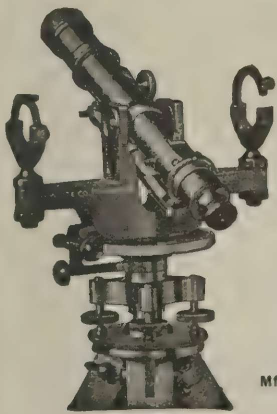
C.H.&E. Portable Saw Rigs

We Manufacture 6 Different Sizes
Saw Rigs
Hoists
Elevators
Mortar Mixers
Pumps

Write for Catalog



C. H. & E. Manufacturing Co.
259 MINERAL ST. MILWAUKEE, WIS.



No. 2020

Make a "WHITE" CONVERTIBLE LEVEL

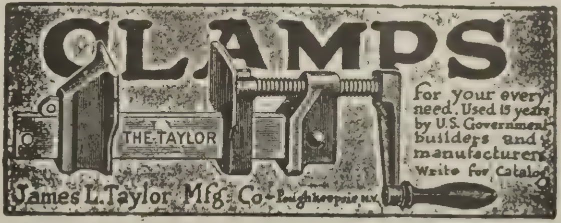
Your partner in business! Then watch your business grow.

Send for description and ten-day free trial order blank.

DAVID WHITE CO.
Mfrs. of Surveying & Drawing Instruments
907-915 Chestnut St.
MILWAUKEE, WIS.

MONARCH CASEMENT WINDOW HARDWARE

5020 Penrose
St. Louis, Mo.


CLAMPS
THE TAYLOR
For your every need. Used 15 years by U.S. Government builders and manufacturers
Write for Catalog
James L. Taylor Mfg. Co. Poughkeepsie, N.Y.

The Improved Rapid Floor Surfacer

Made in several sizes

will surface right up to the wall or baseboard without the use of Edge Roller. Just the machine you would want for surfacing all kinds of wood floors, whether old or new. Will smooth down rapidly and easily all joints or warped edges. Perfect results guaranteed. More than 20,000 of our machines now in use. Guaranteed against defect in material and workmanship for five years.

Send for our Free Trial Offer. It will interest you

M. L. Schlueter, 223 W. Illinois St. **Chicago, Ill.**

Make Money in Your Spare Time Selling Books

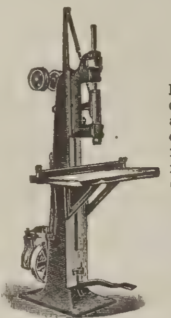
Would you like to make some extra money while covering your own trade?

Books of the following fields—
Architectural—Automobile—Building—Drygoods—Hardware—Iron and Steel—Plumbing and Heating—Sheet Metal

Call or write for special representative plan.

U. P. C. Book Company, Inc.
243 West 39th Street New York

Improved Boring Machine



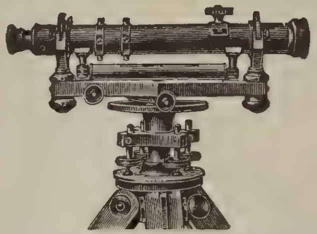
This machine is from new design, and no pains have been spared to make it a first-class machine in every respect. The spindle is made of crucible steel, has No. 2 Morse taper hole to receive chuck, and the bearings are of genuine babbitt metal. It has two stops to regulate the travel of the spindle, one in the head to adjust the downward stroke and one in the treadle for the upward stroke. Greatest length of travel of spindle is 6½ inches. Distance from center of spindle to column, 10″. Table is 26″ x 36″. It is balanced and has a vertical movement of 21″. Spindle is balanced by a coil spring attached to arm on top of frame, making it self-contained. The bracket that carries the driving pulleys has an adjustment of two inches, which is very desirable. T & L pulleys are 8″ x 3″ face, and should make about 800 revolutions per minute. If belt gets loose, loosen screws in front of bracket and by turning set screw on top till your belt is of the right tension.

Manufactured by

R. E. Kidder Co.

35 Hermon Street
Worcester, Mass.

"KOLESCH" BUILDERS' LEVEL

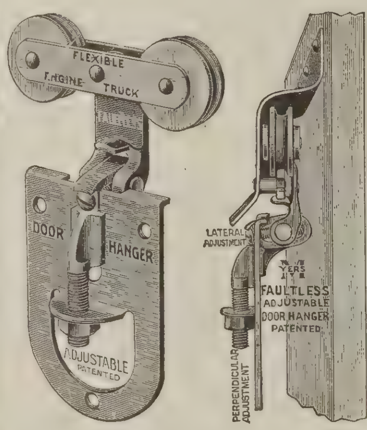


Made to match your requirements in quality, performance, and price.

Use a "Kolesch" and avoid costly errors.

KOLESCH & COMPANY
138 Fulton Street, New York

K TRADE MARK



MYERS

FAULTLESS DOOR HANGERS

have received the endorsement of many architects, contractors and builders, who have found that the self-cleaning, storm and weather resisting features of Myers Faultless Adjustable Hangers and Faultless Self-Cleaning Track appeal to owners and prospective builders of barns, garages, warehouses and similar buildings.

You will be interested in the Myers Faultless and the Eleven other Styles of Myers Door Hangers and Tracks for sliding doorways on any building. Catalog on request.

The F. E. Myers & Bro. Co.
ASHLAND, OHIO

ELASTICA

THE IDEAL EXTERIOR WALL COVERING

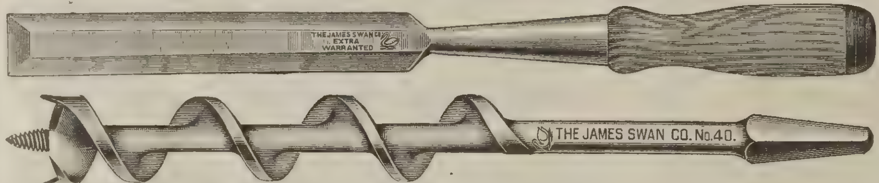
COMPLETE IN A SACK

For Full Particulars Write

Wisconsin Lime & Cement Co.
Conway Building
Chicago

American Materials Co.
101 Park Avenue
New York City

Art Stucco Materials Co., 12854 Oakland Avenue, Detroit.



THE JAMES SWAN EXTRA WARRANTED
THE JAMES SWAN CO. No.40.

LOOK FOR THE
"SWAN" TRADE MARK

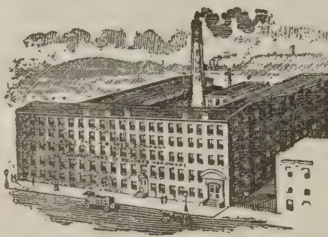
On Chisels, Bits, Gouges, Augers, Draw Knives, Screw Drivers, etc. High Grade Mechanics' Tools known to all good workmen.

Inquiries Solicited

THE JAMES SWAN COMPANY Seymour, Conn.

Awarded the Medal of Honor on Mechanics' Tools at the Panama-Pacific Exposition

---



Manufacturers

The
H. B. Ives Co.
New Haven, Conn.
U. S. A.

Established 1876
Incorporated 1900

BUILDERS' HARDWARE
HIGH GRADE WINDOW AND DOOR SPECIALTIES

WRITE FOR ILLUSTRATED FOLDER

Samson Spot Sash Cord

Spot It by the Spots

Extra quality stock, firm braid, smooth finish and careful inspection. Guaranteed free from imperfections. Far more durable than metallic devices or common roughly braided sash cord.

Send for Samples and Catalogue

Samson Cordage Works, Boston, Mass.

$34.50 **Highwood Dumbwaiters**

Don't Pay More!

Complete, ready to install. Nothing to build or prepare. Any carpenter can place. This low price includes everything—car, machine, counterweight, ropes, nails, etc. Satisfaction or money refunded. Write for catalog.

Highwood Dumbwaiter Co., Park Ave., Leonia, N. J.

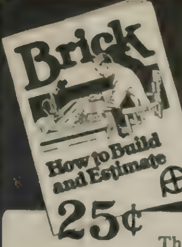
NO FALLING WINDOWS
SMASHING GLASS
POCKET FRAMES
SASH WEIGHTS
RATTLING
BINDING
CORDS with

AUTOMATIC SASH HOLDERS

Economize! ! !
AUTOMATIC
SASH HOLDERS

save labor, lumber and money. *Send for trial set ($1 prepaid), stating approximate weight of sash. Address Dept. B.*

HARDWARE SALES CO., INC.
500 Fifth Ave., New York


Brick
How to Build and Estimate
25¢

New Third Edition-Just Out

Containing 72 Pages of Real Information

This brand new edition contains so much more new material than previous editions that it will pay you well to buy it. The most complete treatise on Brickwork ever published—72 pages of vital information such as, "Tests of Brickwork," "Mortars and Their Preparation," and complete working drawings and details of the new Ideal Brick Hollow Wall. 25 cents postpaid to contractors. 30,000 copies of previous editions now in use.

THE COMMON BRICK INDUSTRY OF AMERICA
1308 SCHOFIELD BLDG. CLEVELAND, OHIO

(Copyrighted, 1918, A. E. CHAPPELL)

The WAYVELL CHAPPELL AUTOMATIC BALL BEARING ELECTRIC FLOOR SURFACING MACHINE is what you need to finish your new or old wood floors *quickly* and just the way you want them.

Patented roller eliminates vibration, also reaches all baseboards, doing away with unsatisfactory work of narrow edge roller.

Pat. 1912-1916

Four sizes—for the largest areas or the smallest rooms. Built to last.

The LITTLE AUTOMATIC ELECTRIC SURFACING MACHINE (on desk) is a wonder for removing varnish from desk tops, counters, etc., or for new work.

Pat. 1916

Write for folders.

Accept Our Free Trial Offer.

Manufactured by

Wayvell Chappell & Company
137-143 No. Jackson St., Dept. O. Waukegan, Ill.

---

for Strength and Utility

HERRINGBONE
(PATENTED)
WALL TIES

Made of extra heavy galvanized metal, with angular corrugations overlapping one another, forming semi-tubular ridges, which increase in strength with every strain.

MAKES A STRONG AND FIRM BOND
Saves Time and Labor
Write for particulars.

MERWIN MFG. CO.
ERIE, PA.

HAND-POWER-FOOT
Wood-Working Machinery

No. 2 SCROLL SAW

10,000 builders are using from one to eight of our different machines.

Any of our machines will pay for themselves in a year and often in a single job.

Our machines are not complicated, but simple, strong, practical and built for good hard work.

MORTISER

A complete line for carpenters and builders. Send for Catalogue and Prices.

W. F. & JOHN BARNES CO.
71 RUBY ST., ROCKFORD, ILL.

ORIGINATORS OF SASH CHAIN

CHAINS

CONTRACTORS WITH THE UNITED STATES GOVERNMENT FOR 40 YEARS

"SASH CHAIN"

"CABLE CHAIN"

"JACK CHAIN"

"PLUMBERS' LINK CHAIN."

"SAFETY LINK CHAIN"

THE SMITH & EGGE MFG. CO.
BRIDGEPORT, CONN., U. S. A.
Our Chains are Recognized as "The Standard"

K & E Measuring Tapes

are well made, of good material, and are reliable.

Prices Revised. Send for New Price List.

KEUFFEL & ESSER Co.
NEW YORK, 127 Fulton St. General Office and Factories, HOBOKEN, N. J.
CHICAGO 516-20 S. Dearborn St. ST. LOUIS 817 Locust St. SAN FRANCISCO 30-34 Second St. MONTREAL 5 Notre Dame St. W.
Drawing Materials · Mathematical and Surveying Instruments · Measuring Tapes

---

WHAT IS THE COST?

Comparatively little, if you use our Copper Conductor Pipe and Eaves Trough, Copper Nails, Elbows, Shoes and Sheet Copper on your building. Let us figure on your requirements.

Pittsburgh Copper and Brass Rolling Mills

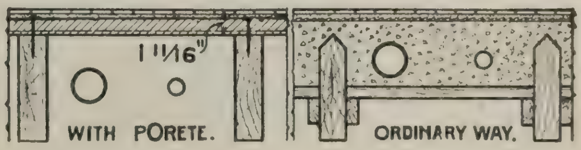
C. G. HUSSEY & CO. PITTSBURGH, PA. U. S. A.

NEW YORK
CHICAGO

Branch Stores in
PHILADELPHIA

ST. LOUIS
CINCINNATI

CEMENT OR TILE FLOORS FOR BATHROOMS IN APARTMENTS, HOTELS, DWELLINGS, ETC.



Which will you rather have, pipes embedded in damp cinder concrete (free of sulfur?) where they rust out soon, or a cement tile floor where the pipes are always dry and clean? Porete floor slabs nailed to wooden beams as a base for tile make a better floor.

We also manufacture Porete for stucco houses and fireproof roofs. Write for circular.

PORETE MFG. CO., 28 Verona Avenue
NEWARK, N. J.

ALPHABETICAL LIST OF ADVERTISERS

A

Acme Weather Strip Co. 80
Allmetal Weatherstrip Co. 86
Aloe Co., A. S. 79
Alpha Portland Cement Co. 16
Amalgamated Roofing Co. 85
Ambler Asbestos Co. 12
American Face Brick Association, The 5
American Floor Surfacing Machine Co. 76
American Materials Co. 90
American Saw Mill Machinery Co. 77
American Wire Fabrics Co. 85
Appalachian Marble Company .. 75
Archer Iron Works 88
Architectural House Planning Service Co. 82
Arrow Book Company 71
Art Stone Co. 87
Art Stucco Materials Co. 90

B

Barnes Co., W. F. & John 91
Barrell Co., W. L., of N. Y., Inc. 2
Beaver Board Companies, The. 17
Bishopric Mfg. Co., The 3
Boyle & Co., Inc., John 84
Brown Co. 96
Buffalo Wire Works Co., Inc. .. 93

C

C. H. & E. Manufacturing Co. .. 89
Caldwell Mfg. Co. 93
California Redwood Association 7
Chappell & Co., Wayvell 91
Common Brick Industry of America, The 91
Compo-Board Co., The 85
Construction Machinery Company 67
Co-operative Foundry Co. 87
Cortright Metal Roofing Co. .. 88
Coulson & Co., J. W., The 83
Creo-Dipt Company, Inc. 83
Crescent Machine Co., The 88

D

Diamond Metal Weather Strip Company, The 10

E

Eastman Kodak Company 63
Economy Heater Co. 84
Edwards Manufacturing Co. 86

G

Griffin Manufacturing Company 78

H

Hardin-Lavin Co. 94
Hardware Sales Co., Inc. 90
Heppes Roofing Division 11
Hess Warming & Ventilating Co. 14, 93
Highwood Dumbwaiter Co. 90
Hollow Building Tile Assn. 87
Hope, Henry & Sons 84
Hussey & Co., C. G. 91
Huther Brothers Saw Mfg. Co. .. 76

I

Illinois Zinc Co. 15
Ives Co., H. B., The 90

J

Jennings, C. E., Co. 86
Johns-Manville, Inc. 88
Johnson & Sons, S. C. 88

K

Kairneer Co., The 72
Keasby & Mattison Co. 12
Keuffel & Esser Co. 91
Kidder Co., R. E. 90
Kimball Bros. Co. 88
Knickerbocker Slate Corp. 93
Koehring Company 73
Kolesch & Co. 90

L

Long-Bell Lumber Company .. 77

Mc

McCray Refrigerator Co. 89

M

MacAndrews & Forbes Company 2
Mack & Co. 93
Magee Furnace Company .... —
Merwin Mfg. Co. 91
Monarch Metal Products 89
Monash-Younker Co. 93
Murphy Door Bed Co., The 81
Myers & Bro. Co., F. E. 90

N

National Asbestos Mfg. Co. 83
National Fireproofing Co. 61
National Kellastone Co. 86
National Lead Company 95
National Manufacturing Company 57
National Sheet Metal Roofing Co. 92
New York Blue Print Paper Co. 81
North Bros. Mfg. Co. 84

O

Oak Flooring Mfrs. Assn. 13

P

Pacific Lumber Co. .... —
Parks Ball Bearing Machine Co. 79
Porete Mfg. Co. 91
Progressive Mfg. Co., The 82
Pullman Mfg. Co. 87

R

Ransome Concrete Machinery Co. 6
Richardson Company, The 11
Richards-Wilcox Mfg. Co. 87
Rogers Brothers Company 75

S

Samson Cordage Works 90
Sargent & Co. 78
Schlueter, M. L. 89
Sedgwick Machine Works 88
Sharp Rotary Ash Receiver Corp. 9
Sheldon Slate Co., F. C. 82
Shinn, W. C., Mfg. Company 80
Sidney Machine Tool Co. 85
Smith & Egge Mfg. Co., The .. 91
Steam Corporation, The 74
Stanley Works, The 18
Stover Manufacturing & Engine Co. 83
Swan Co., James 90

T

Taylor Mfg. Co., James L. 89
Taylor, N. & G., Company 8, 93

U

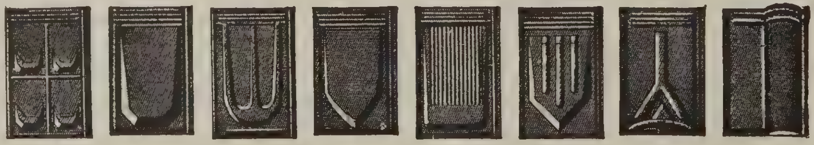
United Publishing Co. 89
United States Gypsum Company 65
U. S. Mineral Wool Co. 81

V

Vulcanite Roofing Co. .... —

W

Wadsworth Howland & Co., Inc. 82
Washburne & Co., E. G. 88
White Co., David 89
White, L. & I. J. 89
Wickes Brothers 83
Williamsport Rope Co. .67, 68, 69, 70
Wisconsin Lime & Cement Co. 90
Wissler Instrument Co. 89
Wood-Mosaic Co. 2



Walter's and Cooper's Metal Shingles

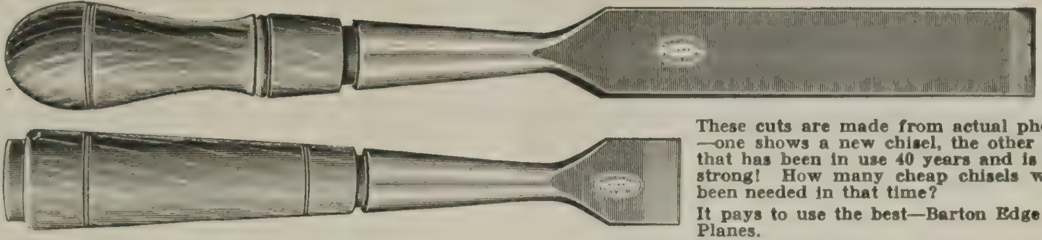
The Shingles That Last

The Shingles That Last

The Most Complete Line of Designs
The Best Material, Workmanship and Finish
Made in Painted Tin or Genuine Re-dipped Galvanized Tin
Sold at the right price
May we send you full-size samples and prices?

National Sheet Metal Roofing Co., 339-345 Grand Street
JERSEY CITY, N. J.

Over 40 Years of Comfort and Satisfaction!



These cuts are made from actual photographs;—one shows a new chisel, the other shows one that has been in use 40 years and is still going strong! How many cheap chisels would have been needed in that time?

It pays to use the best—Barton Edge Tools and Planes.

Genuine only if stamped "D. R. Barton." If your dealer won't supply you we will.

Write for "The Carpenter's Catalog" and "True Stories." Free, of course!

MACK & CO., Brown's Race and Platt Street, ROCHESTER, N. Y.

CALDWELL SASH BALANCES UNIFORM MORTISES

Patent Pending

They have stood the test of time

For use in all classes of new work

Box frames unnecessary

Mortises cut at mill reduce cost of installing. Counterbalance sashes at any given point. They outwear ordinary weights and cords. Unaffected by atmospheric conditions.

Cheapest method for modernizing old windows, as alterations in sashes and frames are not necessary. Sashes should be weighed before ordering.

Write for Circula.

Caldwell Mfg. Company
5 Jones St., Rochester, N. Y.

Can You Use This Space?

If so, write

BUILDING AGE

920 BROADWAY, NEW YORK CITY

Target-and-Arrow Roofing Tin

This is a specialty of ours, handed down from the early days of our business. In this brand we have preserved an old-time standard of manufacture, for the use and benefit of present-day architects. Few building materials have had so thorough a test of time as TARGET-and-ARROW ROOFING TIN. It remains today the same durable quality that we have supplied to American sheet metal workers for more than eighty years. It costs a little more than other roofing tin, so you are not likely to get Taylor quality if you write a specification that permits substitution.

N. & G. TAYLOR COMPANY
OF PHILADELPHIA
Headquarters for Good Roofing Tin since 1810
Now in 112th Year

MANUFACTURERS OF HIGH GRADE AIR VALVES

ESTABLISHED 30 YEARS

QUALITY—REPUTATION—RESULTS

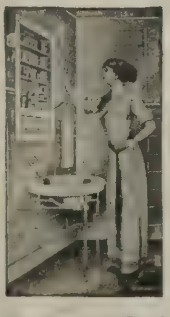
SPECIFY AND USE

MONASH No. 6 Four-Way-Drain Automatic Air Valve The Valve with a Reputation.
ONLY VALVE that Has Stood the Test of Time. Simple in Construction—Reliable.
NOTHING Can Prevent its Perfect Operation. Locked Shield —Fool Proof—Efficient.
A Fuel Saver. No Air Bound Radiators. Guaranteed Five Years—Will Last a Lifetime.
SELF-CLEANING—Four-Way-Drain Attachment Removes Core Sand and Dirt.
HAS Special Key for Adjusting Which Prevents Valve Being Tampered With.

TRADE MONASH MARK

New York 112 W. 42 St. MONASH-YOUNKER CO. Chicago 553 W. MonroeSt.

HESS SANITARY LOCKER



The Recessed Steel Medicine Cabinet

The Only Modern, Sanitary STEEL Medicine Cabinet

or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Costs Less Than Wood
Never warps, shrinks nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room
Four styles — four sizes. To recess in wall or to hang outside.

The Outside Steel Cabinet

Send for Illustrated Circular

HESS, 1201-L Tacoma Building, Chicago
Makers of Steel Furnaces. Free Booklet.

ROOFING SLATE

STANDARD GRADES AND GRADUATED

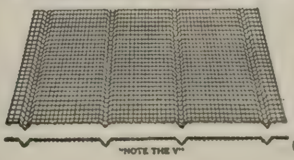
Reds Greens Purples Blacks

STRUCTURAL SLATE—BLACKBOARDS

KNICKERBOCKER SLATE CORP.

E. J. Johnson, Pres. 153 EAST 38th STREET, NEW YORK

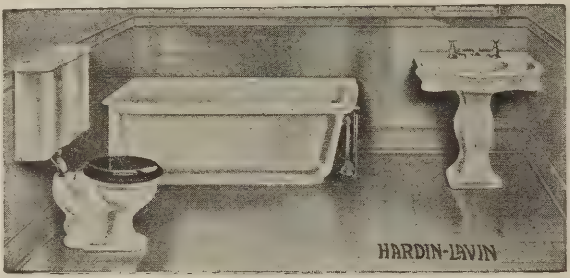
Grimm's WIRE LATHING

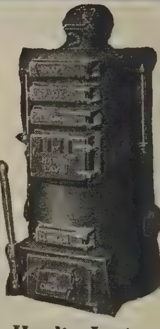


CORRUGATED GALVANIZED
Requires no furring. Stapled right to studding or sheathing. Easy to handle. Cannot rust. Light, durable, economical. Especially adapted to stucco work. *Write for special booklet 61-F on wire lathing*
BUFFALO WIRE WORKS CO., Inc.
(*Scheelers' Sons*) 446 Terrace, Buffalo, N.Y

BUILDERS—INSTALL YOUR OWN PLUMBING AND HEATING BY OUR *NEW EASY METHOD*

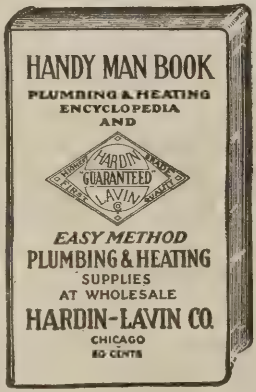
Reduce The High Cost of Building

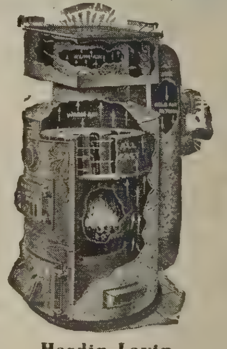



Hardin-Lavin Hot Water Boiler

Contractors and Builders. Include the plumbing and heating in your next contracts. ***Our new easy method*** of installation enables you to do this without difficulty. You save the high cost of skilled labor, unnecessary material and heavy work with our simplified systems. Any handy man can do the installing by following our easily understood working plans and specifications. Our patented adjustable labor-saving connections save much cutting, threading, time and unnecessary material. Even if you intend to employ a practical plumber, your big saving by using our products and ***new easy method*** of installation will surprise you. Contractors and builders are given special wholesale prices. ***Bid on the finished contract.***

Send for Our Big Handy-Man Book Catalog


HANDY MAN BOOK
PLUMBING & HEATING ENCYCLOPEDIA AND
HIGHEST GRADE HARDIN "GUARANTEED" LAVIN FIRST QUALITY
EASY METHOD
PLUMBING & HEATING SUPPLIES AT WHOLESALE
HARDIN-LAVIN CO.
CHICAGO
50 CENTS


Hardin-Lavin Pipeless Furnace

This well bound ***Handy-Man Book*** catalog contains hundreds of floor plans, elevations, diagrams, designs and installing sketches, from the simplest to the most difficult systems, plainly showing in detail our simplified method of installing or repairing your own plumbing and heating. Gives hundreds of mechanical rules, kinks, receipts, practical short cuts, etc.; how to repair leaks; how to lay out plumbing and heating; how to estimate costs, including labor; the proper care for heating plants. It shows and describes over 10,000

Factory Fitted Plumbing and Heating Plants

fixtures and supplies, with wholesale prices on everything; helps you select the best plumbing outfit, water supply system or heating plant to meet your needs; thoroughly describes our ***new easy method;*** shows you how to save skilled labor, unnecessary material and heavy work by this modern and quicker method. Any handy man can do his own work with the aid of this plumbing and heating encyclopedia. It is a revelation even to the most experienced contractor. It thoroughly explains

Our New Inexpensive Easy Installing Method

We carry everything in first grade plumbing and heating supplies from the low priced plain designs to the larger and more elaborately designed fixtures. ***Bathroom outfits, closets, lavatories, bath tubs, sinks, laundry tubs, water supply systems, water heaters, pumps, pipeless and warm air furnaces, hot water and steam plants, pipes, fittings, valves, etc.,*** all factory fitted for the handy man, with Beauty, Lasting Durability and Ease of Installation built thru and thru.

Let Us Help You Plan and Install

Send us a rough sketch or plan of your building, or tell us about what you have in mind for a plumbing outfit, water supply system or heating plant and our ***Practical Service Department*** will show you the simplest, most inexpensive and best method of installation and will help you select the best suited fixtures or systems to meet your requirements.

HARDIN-LAVIN CO.
4538-48 Cottage Grove Av., Chicago

Enclosed find ten stamps. Please send me your big, complete Handy-Man Book Catalog with special contractors' wholesale discount sheets. Also mail me your free monthly bulletin service. I am interested in. mark X

- ☐ **Plumbing,**
- ☐ **Pumps,**
- ☐ **Water Supply Systems,**
- ☐ **Pipeless Heating Plants,**
- ☐ **Hot Water and Steam Heating Plants,**
- ☐ **Warm Air Heating Plants,**
- ☐ **Septic Tank Syphon.**

Name

Street and No.

City State

SPECIAL LOW BUILDERS' PRICES

Write Today and Save

OUR LABEL PROTECTS YOU

Our label appears on our fixtures and systems—marks the end of guess work in buying and is your money back guaranteed protection, backed by our $500,000 Plants.

Hardin-Lavin Water Supply Systems

HARDIN-LAVIN CO.

50 Years at 4538-48 Cottage Grove Av., Chicago

Red-Lead that won't harden in the pail

You can appreciate what that means. No loss through hardening. No time lost in using. Because of its extreme fineness and purity this red-lead remains soft and workable in the pail.

Dutch Boy Red-Lead is pure red-lead in paste form. It contains pure linseed oil. The addition of more linseed oil brings it down to a paint consistency. Brushes out easily, giving a smooth, even coat. Painters like to work with it. Dutch Boy Red-Lead also comes in liquid form—ready to use.

A coat of Dutch Boy Red-Lead is like a coat of armor on any metal surface. It renders such surfaces rust-resistant.

Color pigments may be added to Dutch Boy Red-Lead for finishing coats.

Specify this famous red-lead for all metal structural work and for railings, gutters, flashings, metal roofs, etc.

Write to us for Painting Helps No. 19.

"Save the surface and you save all"—*Paint & Varnish*

NATIONAL LEAD COMPANY

New York	**Cleveland**	**Boston**	**Buffalo**
Cincinnati	**Chicago**	**San Francisco**	**St. Louis**

John T. Lewis & Bros. Co., Philadelphia
National Lead & Oil Co., Pittsburgh

Dutch Boy Red-Lead

BERMICO

Sheathing Paper

Winter's cold never gets into the house that is insulated with BERMICO Sheathing Paper.

The unusual protective properties of BERMICO are due to the spruce wood fiber which is carefully selected and to other processes of manufacture that have made this Sheathing Paper the choice of the majority of successful architects and builders.

"Ask Your Dealer"

BROWN COMPANY
PORTLAND, MAINE
Established 1852.

UNIVERSITY OF ILLINOIS-URBANA
3 0112 105289505